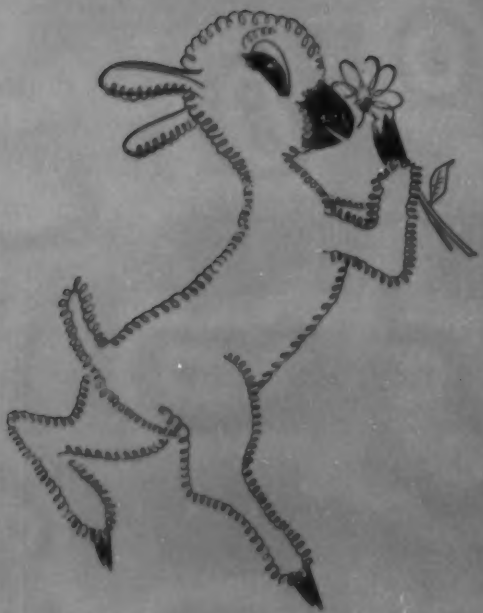
JOURNAL
OF THE
AMERICAN VETERINARY MEDICAL ASSOCIATION

(Contents continued on adv. pages 2 and 4)

Volume 127 SEPTEMBER 1955 Number 942

vaccinate feeder lambs against Type D enterotoxemia



Type D bacterin and Type D antitoxin were originated and first introduced to practitioners after years of research in Corn States laboratories. They have received enthusiastic and unqualified endorsement from the profession and from the sheep industry. They are sold to graduate veterinarians only. Write for literature.

Clostridium Perfringens Type D Bacterin

Most sheepmen report that vaccination against Type D (ovine) enterotoxemia is essential for successful feeding operations. Otherwise, heavy losses may occur.

Millions of lambs have been protected by practitioners who immunized them with Corn States Clostridium Perfringens Type D Bacterin.

Vaccination with Type D bacterin prevents enterotoxemia of sheep either on pasture or in the feedlot. It prevents losses, saves feeding time, and gets the lambs to market early.

This season vaccinate feedlot lambs with Type D bacterin. After the expiration of the 10 day period for development of immunity, sheepmen can allow access to lush pastures or fattening rations with little danger. Type D bacterin is available in 50 cc., 250 cc., and 500 cc. bottles.

Clostridium Perfringens Type D Antitoxin

Check explosive outbreaks of enterotoxemia with Clostridium Perfringens Type D Antitoxin. Type D antitoxin establishes immediate passive immunity. It can be given to range, feeder, and suckling lambs. Type D antitoxin is available in 100 cc. and 250 cc. bottles.

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EVA (Erysipelas Vaccine Live Culture, Avirulent) is an entirely **new** product for swine erysipelas immunization. It permits **safe** immunization with a **live** culture vaccine for maximum protection and lasting immunity.

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Lincoln **Nebraska**

Journal of the American Veterinary Medical Association

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CLINICAL DATA

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Published monthly at 600 S. Michigan Ave., Chicago, Ill., by the American Veterinary Medical Association. Entered as second class matter August 10, 1932, at the Post Office at Chicago 5, Illinois, under the act of March 3, 1879. Additional entry at Mendota, Ill. Accepted for mailing at special rate of postage provided for in Section 538, act of February 28, 1925, authorized August 10, 1932.

Reprints should be ordered in advance. Prices will be quoted after publication. Please send prompt notice of change of address, giving both old and new. Advise whether the change is temporary or permanent. Address all correspondence to American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill.

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broad-spectrum bactericide,
fungicide, protozoacide and virucide
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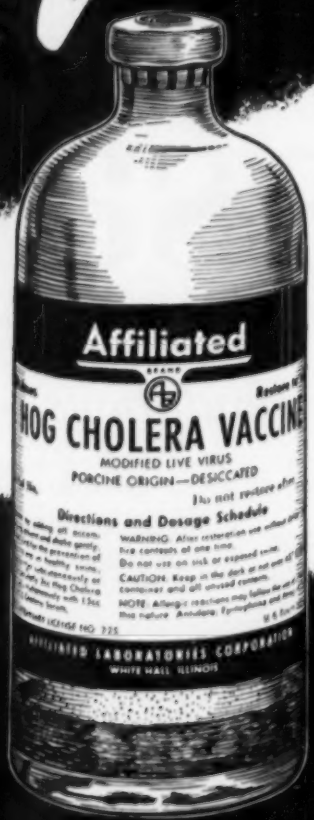

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AVMA ☆ Report

Veterinary Medical Activities

Radio and Television Programs Featuring AVMA Members at the 92nd Annual Meeting in Minneapolis

WLOL—½-hour round-table discussion on "Twin City Round-Table" for broadcast Sunday, August 21, at 7:30 p.m.

Subject—What the Public Doesn't Know About Veterinary Medicine.
Speakers—Dr. Charles E. Bild, Dr. John L. McAuliff, Lt. Col. Robert L. Hummer.

WCCO-TV—3- to 5-minute interview on the "Arlie Haeberle Show" to be telecast at 3:00 p.m. Monday, August 15.

Subject—Birds.
Speaker—Dr. Alan Bachrach.

WCCO—(Radio)—5- to 8-minute interviews to be taped Tuesday, August 16, for delayed broadcast.

Speaker	*Subject*
Dr. R. W. Ormsbee	Preventive Medicine.
Dr. J. A. Muffly	Hardware Disease.
Dr. W. A. Aitken	Shipping Fever.
Dr. C. L. Nelson	Turkeys.
Dr. H. E. Amstutz	Diseases of the Newborn Calf.
Dr. E. V. Morse	Leptospirosis.
Dr. B. F. Trum	The Uses of Radioisotopes in Veterinary Research.
Dr. E. P. Johnson	Newcastle Disease.
Dr. A. K. Kuttler	Brucellosis.

WTCN-TV—7-minute interview 5:50 to 6:00 p.m., Monday, August 15, on the "Captain Eleven Show."

Subject—Care of Pets.
Speaker—Dr. Francis T. Candlin.

Also

Interview on the "Midday Matinee" at 3:45 p.m., Monday, August 15.

Subject—What Veterinary Science Means to Mankind.
Speaker—Dr. Floyd Cross.

KUOM, WDAY, Fargo, KSTP, St. Paul, and a network of 18 stations—5- to 10-minute interviews to be taped Monday, August 15, for delayed broadcast.

Speaker	*Subject*
Dr. R. J. Anderson	Federal Cooperative Disease Eradication Activities.
Dr. R. D. Radeleff	Chemical Poisoning of Animals.
Dr. H. S. Cameron	Brucellosis.
Dr. C. D. Lee	Poultry.
Dr. F. M. Birch	Quality Milk Control.

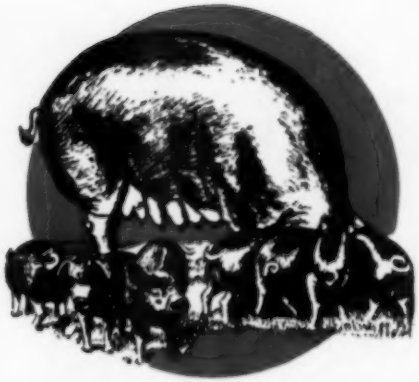
KEYD-TV—3-minute interview on "News" at 6:00 p.m., Monday, August 15.

Subject—Brief Highlights of the Convention.
Speaker—Dr. A. H. Quin.

Also

3- to 5-minute interview on the "Marjorie Ellis McCrady Show" to be telecast during the show 4:00 to 4:30 p.m. on Tuesday, August 16.

Subject—Tips on Feeding Pets, and Personality of Pets.
Speaker—Dr. Mark L. Morris.



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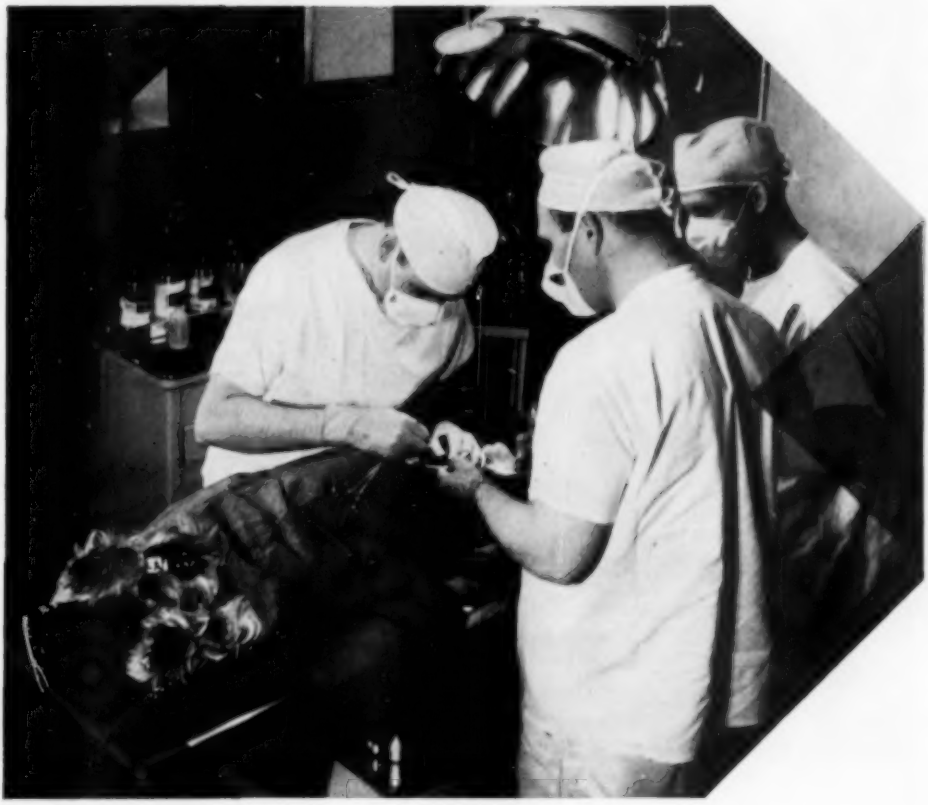

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5	mg	Sulfamerazine, Microcrystalline	46.08	3.84	32¢	3 gross
5	mg	Sulfathiazole Microcrystalline	50.40	4.20	35¢	1 gross
7.5	mg	COBALT SULFATE		4.68	39¢	Dozen
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300,000	Units	Cryst. Penicillin Potassium G	31.68	2.65	22¢	10 gross
100	mg	Dihydrostreptomycin (as sulfate)	36.00	3.00	25¢	5 gross
5	mg	Sulfamerazine, Microcrystalline	38.80	3.24	27¢	3 gross
5	mg	Sulfathiazole Microcrystalline	41.76	3.48	29¢	1 gross
7.5	mg	COBALT SULFATE		3.72	31¢	Dozen

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LEPTOSPIRA BACTERIN

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MAJOR ADVANTAGE: One injection protects for at least 6 months.[1]

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References: 1. Brown, A. L., et al.: To be published. 2. Agricultural Research Service, Losses in Agriculture, June 1954, Table 20, p. 129. 3. Georgia Veterinarian 6:9 Nov.-Dec.) 1954.

'Antilepto'

LEPTOSPIRA BACTERIN

significantly lowers losses from bovine leptospirosis

FACTS AND FIGURES: Annual losses from bovine leptospirosis estimated at 25 million dollars more than those from bovine brucellosis![2]

COMPARISON OF LOSSES FROM BOVINE DISEASES[2]

	BRUCELLOSIS	LEPTOSPIROSIS*
Animals	$45,000,000	$93,080,000
Milk	$42,000,000	$19,202,000
Total Annual Losses	$87,000,000	$112,282,000

*Leptospirosis is widespread "throughout the United States in every geographical region . . . all climatic zones . . . all seasons of the year."[3]

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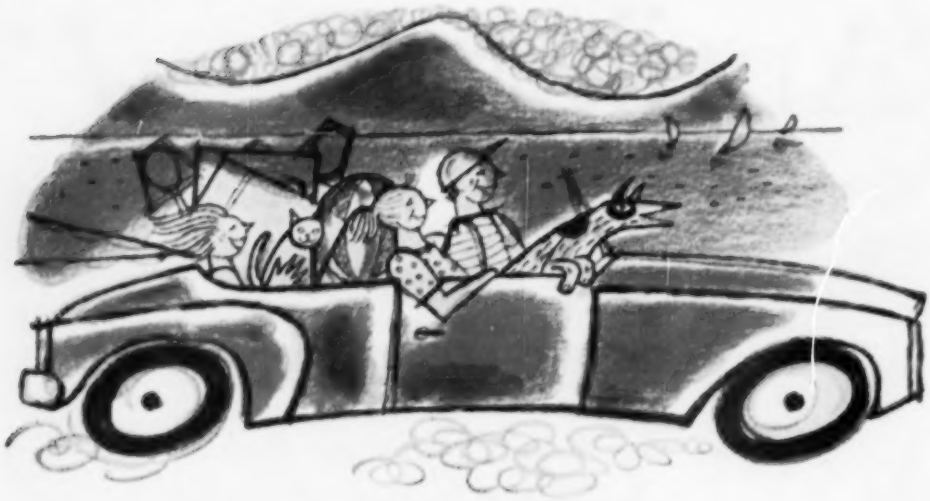

For the nausea often associated with motion sickness, "nervous gastritis," and the administration of certain drugs, such as anthelmintics, you want prompt, long-lasting, and effective control.

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Brand of meclizine hydrochloride

Bonamine is also indicated:

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- to control nausea of worming
- whenever a general anti-nauseant is required

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available in two easy-to-use forms: vials for injection, and capsules for oral administration.

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readily absorbed with prompt establishment of fully effective blood concentrations.

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Steclin Hydrochloride Veterinary for parenteral administration is supplied in vials of 100 mg., 1.0 gm. and 2.5 gm. crystalline tetracycline hydrochloride with ascorbic acid as a buffer, and procaine hydrochloride and magnesium chloride.

Solutions of Steclin Veterinary for parenteral use may be prepared with Water for Injection U.S.P., Dextrose Solution U.S.P. or Sterile Isotonic Sodium Chloride Solution U.S.P. Steclin for parenteral use should be given by deep intramuscular injection or by intraperitoneal administration.

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capsules

Capsules of Steclin Hydrochloride Veterinary for oral administration are supplied in bottles of 100, each capsule containing 250 mg. crystalline tetracycline hydrochloride.

RECOMMENDED DAILY DOSAGE: ***For small animals,*** **25 to 50 mg. per pound of body weight, administered in divided doses every 6 to 12 hours;** ***for larger animals,*** **5 to 10 mg. per pound of body weight, administered once per day.**

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Wilson & Co. also maintains a staff of highly trained and well qualified nutrition experts to assist the Veterinary in keeping Ideal the best in the way of a perfectly balanced diet for me and my (ahem) Pekinese (ahem) girl friend.

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3. 100% palatability—we really go for Ideal!
4. No contra indications—no additions needed—its COMPLETE!
5. All natural food ingredients—no synthetics added.

In fact, Ideal is a better diet than my owner, Mr. Urbanite, gets when he even has steak, vegetables, milk, vitamin supplements and pie.

So please, doctor, prescribe Ideal for me and my friends—you'll do us a favor—we love it!

Yours truly,

REX (the Collie)

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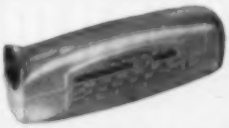
Although principally used for blood cell counting this counting chamber is also most useful for measuring or counting blood and sperm cells, yeasts, molds and parasites. Inexpensive, useful, accurate, durable.



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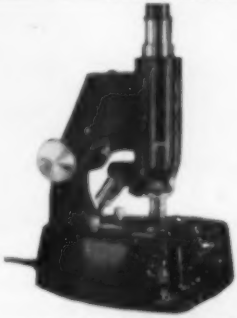

AO 78B MICROSCOPE

Recommended for veterinarians and breeders — this convenient, easy-to-use, low-cost microscope (100X to 430X) is useful for many routine studies such as blood cell counts, sperm motility and viability, urine, fecal materials, and some of the larger animal parasites.

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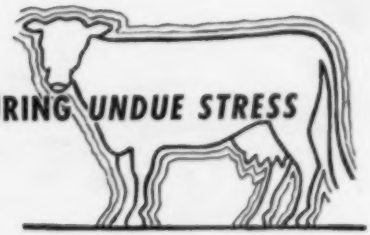
FOR STIMULATING ANIMALS DURING *UNDUE STRESS*



dynamone

ARMOUR

Primary ketosis of dairy cows (if glucose therapy is utilized)*

Dehydration

Fever toxemias

Exhaustion or fatigue

Pre- and postoperative support

Management of convalescence

Cachexia

***Dynamone (Armour) cannot be considered as a replacement for Adrenomone in severe cases of primary ketosis.**

2-way therapeutic action

An efficient and economical physiological stimulant, containing 100 U.S.P. units of ACTH in a 50% glucose solution. Dynamone (Armour) provides the animal with a two-fold source of energy (1) REPLACEMENT THERAPY glucose being an immediate available energy source.

(2) STIMULANT THERAPY — ACTH serves as a stimulant for adrenals providing the entire spectrum of gluco-corticoids (compound E-and F-like steroids) which in turn accelerate the conversion of fat and protein to glucose and glycogen.

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Package information: Dynamone (Armour) is available in cartons containing 6 and 12 x 500 cc. bottles.

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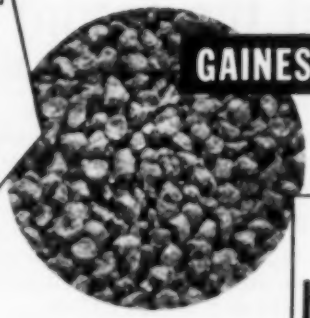

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Fort Dodge Laboratories, Inc., Fort Dodge, Iowa

Journal
of the
American Veterinary Medical Association

VOL. 127 SEPTEMBER, 1955 No. 942

Suspected Drug-Induced Anemias in the Chicken

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THE WIDESPREAD use of medicated feed and the indiscriminate use of potentially dangerous drugs by the poultry flockowner may create a hazard as well as an aid to the poultry industry. During the past three years, we have observed an increased incidence of an anemia syndrome in poultry. The condition is characterized by listlessness, loss of flesh, paleness of comb and wattles, general weakness, and finally death. The number of birds affected in an individual flock varies from 5 to 40 per cent of the flock; however, the mortality is low. Flock histories in most instances have indicated an extensive use of drugs either in the drinking water, feed, or in both. Although this condition has been referred to frequently as the "hemorrhagic syndrome," a majority of the birds examined in the Middlewest do not show hemorrhages.

A review of the literature reveals little information on the effect of coccidiostats and growth stimulants on the hematopoietic system of the chicken.

REVIEW OF LITERATURE

Delaplane and Milliff[1] reported toxication in chickens following the use of sulfaquinoxaline. They reported that individual birds became listless, weak, showed pallor, and eventually died. Lesions were observed in the kidneys, lungs, spleen, and liver. Hemorrhages were observed in the kidneys, subcutaneously on the legs, and combs in most birds that died. More recently Gray, Snoeyenbos, and Reynolds[2] reported on a hemorrhagic syndrome in chickens observed in field outbreaks. The affected birds had hemorrhages, pale blood, fatty bone marrow, liver necrosis, intestinal ulcers, and anemia, but hemorrhage was not frequently observed in affected birds.

A variety of drugs have been reported by Osgood[3] and Wintrobe[4] as capable of producing hypoplastic anemia in man. These include organic arsenicals, benzene, dinitrophenol, and the sulfonamides. In view of the relative frequency of the anemic condition in chickens, the following selected case histories, as given by the owners, along with our findings will serve to illustrate the condition.

METHOD

Bone marrow and blood smears were stained by Wright's stain. Wintrobe hematocrit tubes were used for determining packed red cell volume at a speed of 3,000 r.p.m. for 30 minutes. Hemoglobin was determined with a Rôuy photrometer.* The balanced oxalate anticoagulant recommened by Wintrobe[4] was used for hematocrit determinations. A necropsy was performed on all chickens submitted to the laboratory. Blood studies were made on 1 or more representative birds of each flock.

CASE REPORTS

Flock 1.—The owner of a flock of 2,000 pullets about 11 weeks of age reported a loss of 50 birds during a four-week period. The flock had been placed on a high level of oxytetracycline at 8 weeks of age and remained on it for 18 days. Concurrently, since histomoniasis was suspected in the flock, 4-nitrophenylarsonic acid was added to the drinking water for nine days, followed by a therapeutic level of sulfaquinoxaline in the drinking water for three days. The chickens submitted for examina-

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*The Rouy photrometer is produced by E. Leitz Inc., New York, N. Y.

tion were weak, emaciated, and had a marked yellowness of the skin.

Necropsy revealed an enlarged liver in 1 bird, which contained a few scattered white foci about 2 mm. in diameter. The spleens and kidneys were enlarged and the bone marrow of the femurs was pale yellow.

The blood was watery and light red. The hematocrit reading was 7.0 per cent; hemoglobin, 2.1 Gm./100 cc; and the erythrocyte count, 640,000/1 cmm. In stained blood smears, the erythrocytes appeared normal except for a few basophilic erythrocytes and a moderate anisocytosis. A marked granulocytopenia and thrombocytopenia were observed. The differential count was 95 per cent lymphocytes and 5 per cent monocytes. Stained bone marrow smears showed a decrease in cellularity consisting mainly of erythrocytes and lymphocytes.

Histological examination of the livers showed a dilatation of the sinusoids and a lymphocytic infiltration around the blood vessels; histomonads were not demonstrated. Areas of focal necrosis were found in the spleens, and necrosis of tubular epithelium was prominent in the kidneys.

Flock 2.—A flock of 60 Leghorn chicks had been given 3-nitro-4 hydroxyphenylarsonic acid continuously in drinking water from the first to the fifth week of age. The flock then had been given a therapeutic level of sulfaquinoxaline in the drinking water for three days. The flock was on a feed containing a high level of oxytetracycline and chlortetracycline. A rooster and a pullet were submitted for examination at 8 weeks of age because the chickens appeared pale, listless, emaciated, and had yellow combs.

Necropsy revealed normal internal organs, with the exception of pale yellow livers. Bone marrow of the femurs was gray-yellow. The blood of both birds was watery.

The hematology of the rooster showed: hematocrit, 8.5 per cent; hemoglobin, 2.1 Gm./100 cc.; and erythrocytes, 310,000/1 cmm. For the pullet, the reading was: hematocrit, 10.0 per cent; hemoglobin, 2.8 Gm./100 cc.; and erythrocytes, 570,000/1 cmm.

The stained blood smears showed a moderate anisocytosis with a few basophilic erythrocytes. No leukocytes were observed in the blood smears of either bird. Stained bone marrow smears showed a hypoplasia, with the remaining cellular elements consisting of erythrocytes and a few lymphocytes.

Flock 3.—A flock of 2,900 birds 10 weeks old had been given two intermittent, three-day treatments of sulfaquinoxaline starting at 8 weeks of age. The chickens were weak, pale, and some had diarrhea. Necropsy of several chickens revealed thin watery blood, enlarged pale kidneys, and a pale yellow bone marrow in the femurs.

The hematocrit reading was 8.0 per cent; hemoglobin, 2.4 Gm./100 cc.; and erythrocyte count, 760,000/1 cmm. In stained blood smears, the erythrocytes showed a moderate anisocytosis with a few erythroblasts and basophilic erythrocytes present. Bone marrow smears were less cellular than normal but contained an apparently normal erythropoietic tissue. There was a marked reduction of granulocytes, metamyelocytes, and myelocytes. The less mature forms of the myeloid series were plentiful.

Flock 4.—In a flock of 200 White Plymouth Rock pullets 11 weeks old, 30 to 40 birds had died between the 9- to 11-week period. Sulfaquinoxaline had been given to the flock in the drinking water continuously for four weeks previous to the time that the chickens were submitted for examination. The owner stated that 25 to 30 per cent of the flock were affected, the birds appearing pale, droopy, emaciated, and weak.

Necropsies of several chickens revealed thin watery blood, emaciation, and pale livers and kidneys. The femoral bone marrow was yellow. The hematocrit reading was 11.0 per cent; hemoglobin, 3.0 Gm./100 cc.; and erythrocyte count, 870,000/1 cmm.

Agranulocytosis, mild poikilocytosis, and basophilic erythrocytes were observed in stained blood smears. A few metamyelocytes and lymphocytes were also present. The majority of the thrombocytes showed a tendency for the eosinophilic granules to coalesce, forming either single large or several small masses which pushed the nucleus to one side of the cell. In other cells, as many as 9 to 12 separate eosinophilic granules were observed in various arrangements, as well as vacuolation. The changes were believed to result from toxicity. Stained bone marrow smears were composed chiefly of erythrocytes and lymphocytes.

DISCUSSION

The blood changes found in flocks 1 and 2 were essentially similar to those described in hypoplastic anemia in man. In flock 3, where sulfaquinoxaline was used alone for six days, the major picture observed was that of agranulocytosis. The chickens were submitted for examination about one week from the time the treatment was discontinued. Evidence of blood regeneration was indicated by the presence of immature erythrocytes and metamyelocytes in the peripheral blood. The bone marrow smears made from the same birds showed a large number of mitotic figures indicating regeneration. Flock 4 showed a picture of hypoplastic anemia following sulfaquinoxaline treatment for four weeks. The excessive granulation and vacuolation described in the thrombocytes of these birds suggested a possible toxicity. Subcutaneous hemorrhages on the legs and breast muscles were observed in a few chickens with symptoms of anemia. Various stages of anemia were found in affected birds from the same flock and also in different flocks with the condition.

The great variety of changes encountered suggests that the different forms of anemia, in which all variations from hypoplasia to complete aplasia of the bone marrow occur, are stages in the same process. It seems also that there is an individual idiosyncrasy as usually less than 40 per cent of any affected flock showed symptoms of the disease.

It has been suggested[5] that vitamin K deficiency might be the cause of the anemia and hemorrhage. However, the absence or moderate amount of hemorrhage and the bone marrow and blood findings do not substantiate this theory. The anemia in avitaminosis K is that of acute blood loss. It is unlikely that a vitamin K deficiency exists under common broiler-raising conditions. Furthermore, this anemia has occurred in flocks with ample supply of alfalfa hay in the feed and the addition of menadione has not controlled the anemia after it has been diagnosed in a flock.

A variety of organisms have been isolated from the affected birds. These include *Escherichia coli*, Micrococcus, and Proteus species. We do not attach much significance to this finding as we believe it is secondary to the granulocytopenia; however, infection could cause further hemolysis of the erythrocytes and hypoplasia of the bone marrow. It is possible that drugs can not be entirely blamed for the symptoms and pathological findings observed as other factors may be contributing to the pathogenesis of the condition. No known disease-causing agent was isolated from the birds reported in this paper.

A study is underway in this laboratory to reproduce the disease by using different drugs.

SUMMARY

1) An anemic condition in the chicken resembling hypoplastic anemia of man is described.

2) Affected birds were weak, had pale combs, appeared listless, sometimes had diarrhea, and eventually died.

3) From 5 to 40 per cent of the birds in the flocks showed symptoms of the disease but the mortality was not high.

4) Drugs appeared to be the cause of the condition, either alone or in conjunction with other unknown factors.

5) The blood and bone marrow findings from affected birds are described.

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Rumens Perforated in Calf Myiasis

Larvae of *Cochliomyia hominivorax*, which were probably ingested during the licking of infested wounds and which then established themselves in the atrium of the rumen, caused the death of 8 per cent of several hundred calves necropsied on a ranch in Brazil. The larvae caused peritonitis by perforating the rumen and invading the abdominal cavity.—*Vet. Bull., April, 1955.*

The Food and Drug Administration and the Practicing Veterinarian

JOHN H. COLLINS, D.V.M.

Washington D. C.

THE FEDERAL Food and Drug Administration is assigned definite functions in controlling the sale and distribution of drugs for animal use, but it also has definite limitations. It is a law-enforcement unit in the U. S. Department of Health, Education, and Welfare, a relatively small government bureau employing a total of only 938 people. This number includes veterinarians, physicians, pharmacologists, chemists, bacteriologists, and other scientifically trained personnel, as well as food and drug inspectors. It also includes administrative officers, clerical personnel, and laboratory helpers. About 590 of the employees are scientific or technically trained people and, of these, 203 are food and drug inspectors. Of the personnel, 520 are in the field service while 418 are stationed in Washington.

The principal work of the Administration is the enforcement of the Federal Food, Drug, and Cosmetic Act, but it is responsible also for the administration of the Federal Caustic Poison Act, the Federal Import Milk Act, the Filled Milk Act, and the Tea Importation Act.

ADMINISTRATION SETUP

The operating plans are devised to insure adequate attention first to violations of a character that may involve danger to health; second to violations that may result from insanitation, filth, or decomposition; and third to those types of adulterations and misbrandings that involve economic cheats and frauds. In order to insure uniform enforcement throughout the country and to coordinate the activities of the various units of the Administration, project programs are prepared and issued by the Division of Program Research. These programs serve as guides to the field districts and as bases for the work plans of the district offices.

The Washington office includes eight technical or scientific divisions: antibiotics, cosmetics, food, medicine, microbiology, nutrition, pharmaceutical chemistry, and pharmacology, each staffed with specialists in its scientific field. The divisions provide the necessary scientific advice and technical information to the commissioners to enable the formulation of sound regulatory policies and investigational procedures. Their staffs testify in court contests and secure other experts in their fields to testify in support of the Government's case. They conduct scientific research to develop or improve methods of analysis and to acquire scientific data to enable the interpretation of analyses. The divisions also keep abreast of scientific and technological advances in their respective fields and conduct certain analyses and tests on samples that the field laboratories are not equipped to perform.

For the purposes of enforcement of the laws charged to the Food and Drug Administration, the country is divided into 16 field districts, each with a district office in one of its principal cities. Each district office maintains a laboratory and inspection staff. In 36 other cities, one or more resident inspectors are assigned; they work under the direction of their district office. Thus, the Food and Drug Administration has offices in 52 cities scattered throughout the United States. Most of the thousands of samples of foods, drugs, cosmetics, and caustic poisons collected annually are examined in the 16 field laboratories.

If there should be a contested case involving a drug which is misbranded by reason of false or misleading claims, it becomes the responsibility of the Division of Medicine personnel to obtain expert witnesses to furnish the medical and veterinary medical testimony to support the Government's case.

VETERINARY ASPECTS

The director and associate director of the Veterinary Medical Branch prepare replies to voluminous and widely diversified correspondence touching upon veterinary medical matters; they review and process applications covering new drugs proposed for animal and poultry use; they answer requests for advice on veterinary medical subjects from the other Divisions and individuals within the Administration; they review and pass upon all labeling and clinical data for antibiotic drugs intended for animals other than man; they study reports from the 16 district offices concerning inspections of establishments producing drugs for animals other than man; they recommend regulatory actions in-

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This paper was presented at the annual meeting of the Maryland State Veterinary Medical Association in Baltimore on Jan. 28, 1955.

volving these drugs when such actions are indicated; they arrange for adequately controlled tests to evaluate properly the value or lack of value of veterinary medicines for their intended purposes; they provide for the employment of expert witnesses to support the regulatory actions recommended; and they consult with representatives of the hundreds of drug houses on problems involving compliance with the law.

Questions most frequently asked by veterinarians are: "Why doesn't Food and Drug restrict more drugs for animals to use by or on the prescription of a veterinarian?" and "What are Food and Drug's responsibilities to the practicing veterinarian?" In order to answer these questions properly and intelligently, we will have to consider the provisions of the Federal Food, Drug, and Cosmetic Act itself.

PROVISIONS OF THE ACT

The basic intent of the Congress of the United States in enacting the Act was, in the case of drugs, to make the use of drugs, whether by laymen or medical practitioners, a safer procedure than it was before passage of the law. The legislative history of the Act does not show that Congress had any intention of preventing self-medication when this can be done safely and is not contrary to the interests of public welfare.

The Act itself unequivocally requires the labels of all drugs to bear "adequate directions for use," which is interpreted by the regulations to mean directions under which the layman can use a drug safely for the purpose for which it is intended.

In the case of drugs for animal use, the regulations provide two primary exemptions from the "adequate-directions" requirement of the Act:

1) A drug which, because of its toxicity or other potentiality for harmful effect, is not safe for use except under the supervision of a licensed veterinarian shall be exempt if, among other things, its label bears the statement "Caution: Federal law restricts this drug to sale by or on the order of a licensed veterinarian," the recommended or usual dosage, route of administration if not for oral use, and the quantity or proportion of each active ingredient in unofficial preparations fabricated from two or more ingredients.

2) A drug shipped directly to, or in the possession of, a licensed veterinarian shall be exempt if its label bears the required information enumerated above with the exception that the labels of drugs which would be suitable for over-the-counter sales if otherwise distributed must not bear the "caution" statement. In the latter instance, however, there is no prohibition against statements which express a firm's sales policy such as "sold to graduate veterinarians only," "sales to veterinarians only," or similar statements which clearly express a sales policy rather than an inference of some governmental restriction.

In the official opinion of the Food and Drug Administration, there will be comparatively few drugs for animal use which will be entitled to the exemption of the first category. Officially, we must take the position that every owner of animals has the right to attempt to make his own diagnosis and to attempt treatment of his own animals which, admittedly, are his own property. He has a statutory right to demand and receive safe and efficacious drugs with which to attempt that treatment if he so desires. It is the duty of the Food and Drug Administration to enforce the Act in the interests of the general public, particularly the requirements for adequate directions for effective use and adequate warnings for safe use, and the prohibition against false or misleading claims.

In addition to the preceding comments, we must recognize that Congress sets public policy when it enacts laws and in this instance the medication of animals by their owners has been accepted as public policy when the medicine can be safely and intelligently administered by the lay user. The distinction we must draw in our own minds between drugs for animals and drugs for man is that if an animal owner prefers to experiment with his animals' health rather than to seek the advice of a veterinarian, or if he decides to humanely destroy his animals, there is no legal reason why he should not be permitted to do so. There is no comparable legal sanction for him to take or jeopardize the lives of his wife and children, or himself, for that matter. Other than to insist on strict enforcement of local veterinary practice laws, the best, and perhaps the only, way for a practitioner to protect his professional interests from the inroads of those who promote and adopt lay treatment of animals is to provide an up-to-date, scientific service of a higher type than that which can be rendered by laymen.

We are often asked if we think a lay stockman or poultryman is competent to

make an accurate diagnosis of disease in his animals or poultry. Our answer as members of the veterinary medical profession is an emphatic "no!" Obviously, the best qualified person to make a correct diagnosis of a disease condition in animals is a well-trained graduate from a recognized college of veterinary medicine. But we must face two basic issues squarely: (1) The U. S. Department of Agriculture through widespread distribution of "yearbooks" and "farmers' bulletins," the state agricultural experiment stations and universities through "extension bulletins" and "circulars," and many drug houses through promotional sales literature place in the hands of the literate layman the tools of information and knowledge he requires; and (2) as previously stated, the layman, armed with these tools of information and knowledge, has the inalienable right to attempt to make his own diagnosis of the ailments of his own animals.

Quite possibly, the answers to the several questions here involved depend on the individual owner of livestock or poultry and on the quantity and quality of the veterinary service available to him.

Selecting the Modern War Dog

CAPTAIN RALPH E. THOMAS, V.C., U. S. ARMY

Fort Carson, Colorado

This article was written as an aid to the practitioner because in the next few months the Strategic Air Command and the Continental Air Defense Command will purchase a large number of German Shepherd dogs for sentry work. To follow the suggestions in this article will reduce the number of rejections and create good will among all concerned when the veterinarian is called upon to pass on the war dog.

You will ask, "Why German Shepherds?" It can be said that in World War II almost every large breed of dog was used by "Dogs for Defense" for service with the Armed Forces. Those dogs were utilized in every theater of operation, which encompassed every type of climate from Alaska to Iwo Jima. It was soon determined that many breeds had shortcomings which limited their serviceability. The sporting breeds, Setters and Spaniels for example, were unsatisfactory for scouting patrols because it was too difficult for them to overcome the instinct for hunting game. Collies on the whole did not have the stamina necessary to withstand the rigors of combat, and the Doberman Pinschers could not be used satisfactorily in either the tropics or the arctic.

After gaining experience with all large breeds, it was decided to limit purchases to German Shepherds. This breed best meets the three basic requirements of: (1) having the ability to perform all types of service demanded by the Armed Forces; (2) being suitable for duty in all climates; and (3) being a breed with sufficient popularity that replacements would be easily obtainable.

The German Shepherd has uniformity, adequate size and ruggedness, is available in large numbers, and exhibits suitable temperament for work with the Armed Forces. The length of coat makes it adaptable to any climate.

When recommending dogs, it should be understood that they are all bought subject to a trial period and that if one is found to be unsatisfactory, for either physical or training purposes, it will be returned to the owner. It must be 12 to 30 months of age, of either sex (but bitches, must have been spayed at least 120 days), and it must weigh 60 to 90 lb. and measure 22 to 28 inches high at the shoulder. It should be sturdy, well-proportioned, and reveal evidence of power, endurance, and energy. The dog must have good bones, a deep chest with ribs well sprung, strong pasterns, and feet with hard, well-cushioned paws. The front feet should not toe inward or outward. Hindquarters should have moderate angulation and, as viewed from the rear, the hindlegs should be straight, with strong, smooth hips. The dog must be alert, steady, vigorous, and responsive. It must not be timid, nervous, or shy of guns and noise. The dog should be sound mentally and physically, which includes being free from heartworms.

The above information is offered as a guide to the veterinarian performing the physical examinations and executing health certificates for prospective sellers.

Captain Thomas is located at the Army Dog Training Center at Fort Carson, Colo.

This article has been approved for publication by the Public Information Officer, Fort Carson, Colorado

The Pathology of a Fungous Infection Associated with a Caponizing Injury

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Orono, Maine

SYSTEMIC FUNGOUS infections of birds are not common. Witter and Chute,[1] in 1952, reported a systemic infection of poults with *Aspergillus fumigatus*, with a brief review of earlier work. An ophthalmic infection in chicks has been reported by Reis,[2] Hudson,[3] and Moore.[4,5] Litter has been incriminated as a source of infection.[1-3] Many workers based the diagnosis on the isolation of the fungi from clinical cases and were unable to demonstrate the fungi in tissue by histopathological methods. Eggert and Barnhart[6] reported a case of egg-borne aspergillosis in newly hatched chicks. Clark *et al.*,[7] in 1954, discussed aspergillosis on 21 ranches involving 210,000 chicks. These workers concluded that the infection was hatchery-borne and stated that the only lesions present at necropsy in eight broods were white plugs in the bronchi, which they stated was typical of infectious bronchitis. The common finding in experimental and field cases of infectious bronchitis in our laboratory has been a mucous exudate with no white plugs.

CASE HISTORY

Eighteen 6-week-old White Rock Cockerels were brought to the laboratory July 12, 1954. They were from a flock of 5,000 which had been vaccinated against Newcastle disease and infectious bronchitis at 1 day of age. The birds were caponized at 4 weeks of age and mortality started one week later.

Gross Pathology.—The caponizing wound scar on the right side between the last two ribs presented yellow, thick, cheese-like deposits as well as plaque formation. These plaques were found under the skin in the region of the wound (fig. 1). The air sacs were thickened and some contained a cheesy exudate. The livers were swollen and greenish.

Other Laboratory Examinations.—A scraping of the intestine revealed a mild form of intestinal coccidiosis. Blood agar plates did not reveal any significant growth in 48 hours. Sabouraud's medium showed good growth of *A. fumigatus*. Positive cultures of fungi were made from the liver, air sacs, and several areas close to the incision.

We were able to reproduce a respiratory infection using subcultures of *A. fumigatus*. The fungus was reisolated from the

Fig. 1—Small yellow plaques, 1 to 4 cm. in diameter, under the skin of a fungous-infected, caponized chicken.

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The authors thank Mrs. Eleanor Lacombe for technical assistance.

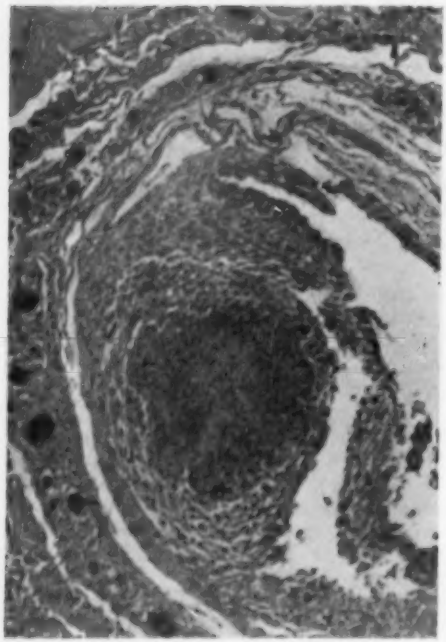

Fig. 2—Large granuloma under skin of chicken. Hematoxylin and eosin stain; x 250.

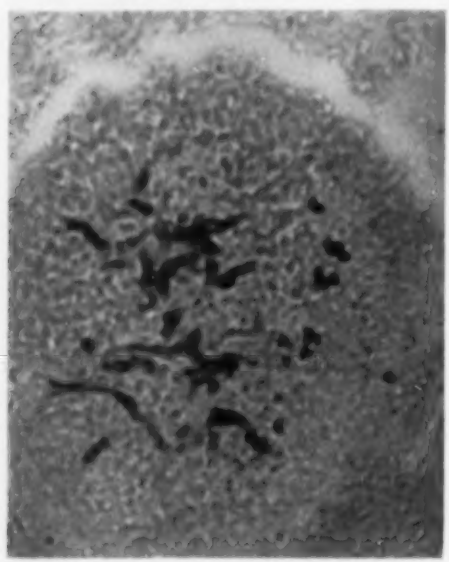

Fig. 3—Center of granuloma with mycelia of fungus. Gridley's stain; x 533.3.

infected lung. Hyphae were observed histopathologically in lung tissue of the experimentally infected chick.

Histopathology (Hematoxylin and Eosin) Stained Sections).—Lungs.—There was a generalized passive congestion of the lungs. A pleuritis was observed consisting of an exudate filled with heterophils, a few reticuloendothelial-type cells, and necrotic debris. A slight epithelial hyperplasia was seen in the tertiary bronchi. An occasional lymphoid focus was observed around the tertiary bronchi. Some periarteritis was present and many heterophils were found in the lumen of blood vessels.

Livers.—The liver presented focal areas of homogenous eosinophilic-staining material. These areas were surrounded by large reticuloendothelial cells, monocytes, and lymphocytes, but giant cells were not evident. There were focal areas of necrosis.

Skin.—The skin presented a chronic inflammatory condition, characterized by numerous granulomas in the corium. The granulomas were composed of necrotic debris containing strands of mycelia surrounded by heterophils, monocytes, lymphocytes, and reticuloendothelial cells. Giant cells were often present. This chronic inflammatory condition extended down into the muscular layer. A typical granuloma is shown in figure 2.

Trachea and Heart.—These organs were negative.

Air Sacs.—The air sacs were greatly thickened, due to lymphoid foci and a fibroplasia. There was an ectodermal hyperplasia. Necrotic exudate and cellular debris adhered to the ectodermal layer.

Muscle.—Striated muscle from the leg was examined and found to contain heterophils in tractlike areas between the muscle fibers in a pink-staining menstruum. Near the surface granuloma formation was common.

Histopathology (Gridley's Stained Sections).—This stain was used because previous experience had shown it was particularly effective for detecting fungi. Definite mycelia were seen in the skin sections. These were noticeable in the center of the granulomas (fig. 3). A high power photomicrograph of the fungi in the tissue is shown in figure 4. Small mycelial branches were noticed in the air sacs and at the periphery of the liver. The heart, lungs,

and striated muscle did not show any evidence of fungi.

DISCUSSION

This case shows that severe loss can result from fungous infections. The literature reveals that systemic infections of fungi in birds are rare. Although *A. fumigatus* has been classed as the etiological agent in brooder pneumonia in chicks, it should be noted that the lungs in this case were not involved, and the birds were not showing any clinical evidence of respiratory disease. Chute *et al.*[9] have shown that fungi

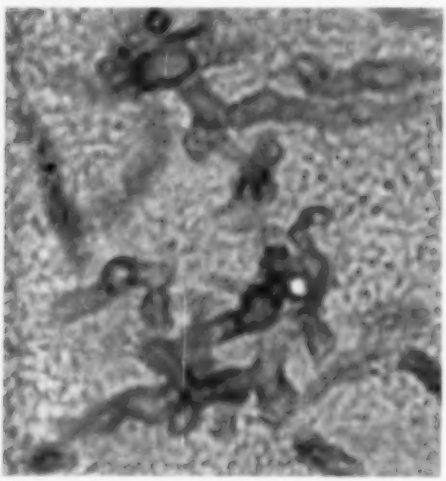

Fig. 4—High power magnification of mycelia in granuloma (fig. 3). Gridley's stain; x 800.

are readily isolated from the lungs and air sacs of birds affected with various respiratory diseases. However, a good method of determining pathogenicity has not been found. Clinical evidence of infection, together with histopathological findings of granulomas with a hematoxylin and eosin stain, promoted further study using a Gridley stain. This stain is a superior method for detecting fungi in the tissue. Unless the hematoxylin and eosin stain is observed carefully, a fungous infection may not be detected. Figures 2 and 3 depict the effectiveness of the Gridley stain.

Another feature of this case is that the infection apparently was spread from 1 bird to another by some unsanitary condition during the caponizing operation. This could have resulted in a contamination of instruments, disinfectants used, or environment. The farm history revealed similar losses and fungous lesions over a period of several years in caponized birds.

SUMMARY

A case of systemic *Aspergillus fumigatus* infection in 5-week-old chicks was reported. This resulted from a caponizing infection. A respiratory infection was produced in a chick by using a subculture from the original isolate.

A routine histopathological examination with hematoxylin and eosin stain might not reveal the etiological factor. The merits of the Gridley stain for fungi detection are discussed.

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Estrogen and Estrous Cycle of Gilts

In a study of controlled breeding at the University of Wisconsin, 12 gilts were injected intramuscularly with 3 mg. of diethylstilbestrol in corn oil at various stages of the estrous cycle. While injections on the sixth day had no apparent effect, injections on the eleventh day lengthened the cycle to an average of 25.6 days, and injections on the sixteenth day shortened the cycle to an average of 17.75 days. The following estrous cycles were normal, averaging about 19 days.—*J. Anim. Sci., May, 1955.*

Cardiac Resuscitation in a Dog with Cardiac Arrest

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Cardiac resuscitation has been successfully employed in reviving human beings with cardiac arrest.[1-4] Much work has been done on the dog, experimentally, in an effort to develop better techniques to be used in cardiac failure in man.[5] Johnson[6] has published articles on principles of cardiac resuscitation and has illustrated these in numerous presentations. Similar techniques were successfully employed in cardiac arrest during intervertebral disc surgery on a paraplegic Pekingese. Although brain damage had occurred from cerebral anoxemia, the dog made a nearly normal recovery as far as the brain and heart were concerned.

Fig. 1—This picture was taken eight weeks after surgery. The dog was walking well but the back was still arched and vision was impaired.

Case Report

A 4-year-old male Pekingese Terrier had been hit by a car and during the following week had gradually developed a posterior paralysis. A severe ulcerative keratitis affected the left eye.

The dog exhibited a flaccid paraplegia with diminished tendon reflexes, urine and fecal retention, and a hypersensitive cutaneous area at the anterior lumbar spinal segment. A normal contrast spinogram revealed a narrowed intervertebral space at the first and second lumbar vertebrae articulation.

From the severity of the signs and the duration of the injury, the prognosis was unfavorable, but the owner insisted on surgery.

Surgery.—One-fourth grain of morphine and 1/150 gr. of atropine were given subcutaneously 45 minutes before the general anesthesia. One grain of pentobarbital sodium plus 0.25 cc. of coramine® were given intravenously until light surgical anesthesia had been reached. As the spinal surgery was initiated, an ether drip was started to obtain better anesthesia.

The surgery proved to be such an interesting class demonstration that the attention of the anesthetist was distracted until respiratory and cardiac arrest occurred. An intracardiac injection of 1 cc. of a 1:1,000 dilution of epinephrine was administered through the chest wall and positive pressure oxygen therapy was started. After a few seconds of persistent cardiac arrest, an intrathoracic incision at the fifth to sixth rib interspace was made. Time was not available to prepare the surgical area. The heart was exposed, the pericardium was incised longitudinally, and cardiac massage was initiated directly to the heart. After 20 to 30 seconds of massage at a rate of 60 to 100 times per minute, the heart gained tonus and started ventricular contractions. After two to three minutes, these contractions became rhythmic and were later stimulated twice, as needed, with 1-cc. injections of 1:10 000 dilution of epinephrine into the right ventricle.

While the spinal surgery was being completed, the heart was carefully observed for signs of failure. The intrathoracic incision was then clipped and cleansed. The heart was still dilated, so the pericardium could not be completely closed. The thorax was then closed in the prescribed fashion except that 1,000,000 units of crystalline penicillin G in 10 cc. of water was given intrathoracically.

The animal was watched throughout the night and was given two 1-cc. injections of caffeine and sodiobenzoate solution for stimulant effect.

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Publication No. 517, approved by the Committee of Publications, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn.

The author is grateful to those veterinary students whose interest in this animal was expressed by tireless efforts to effect his survival. The owner was most helpful in postoperative observations.

Postoperative Observations.—Since the time which had elapsed from onset of cardiac arrest until establishment of the circulation of oxygenated blood was in question, it was feared that cerebral damage might occur. The first postoperative day substantiated that opinion—the dog did not eat, drink, or show any sign of mental recognition. However, a gradual improvement in his mental condition was observed from the second to the eighth postoperative days. On the second day, the animal ate a small amount of food when it was placed in his mouth. On the ninth postoperative day, the dog responded to the owner's voice, and thereafter became fairly normal, mentally.

The eye affected with ulcerative keratitis became highly inflamed from the surgical procedure, as did the normal eye. The dog mutilated the cornea of the previously normal eye, causing a corneal rupture. Although the left eye has cleared except for a small scar in the ulcer area, the dog still does not have vision. He bumps into objects and shows little or no evidence of seeing them. Logically it must be concluded that since the one eye is not showing enough pathological change to entirely occlude vision, the optic nerve and the cortical area in the brain, or both, are damaged.

The paraplegic condition became markedly improved. At the end of one month, the dog was still not walking, but he could move his legs and could control urine and fecal elimination. After a postoperative period of ten weeks, there was an encouraging improvement in hindleg locomotion and now the dog walks well. He has retained a somewhat arched back from previous pain (fig. 1).

Postoperative radiographs revealed a normal-appearing heart as well as a clinically normal-sounding heart. The thoracic incision healed by first intention in spite of the fact that the incision was made through a contaminated field. The initial penicillin administration, as well as several postoperative intramuscular injections of penicillin and streptomycin, effectively controlled infection.

DISCUSSION

This report illustrates the potential role of cardiac massage in cases of cardiac arrest. Although in this case the arrest may have been in excess of three to five minutes, the heart responded to massage promptly. According to Beck,[7] brain damage may occur if arrest has persisted more than three to five minutes. It is the author's opinion that the period of arrest in this case did exceed that limit and brain damage did occur, but it was not entirely irreversible. The animal did regain its mental capacity a few days following surgery, but his vision appears to be seriously impaired.

Cardiac massage has been used on several animals in this clinic and most of them have had temporary cardiac recovery but later have suffered a gradual decrease of blood pressure and death. This is the first clinical case that has made a permanent recovery.*

Cardiac massage in the dog is not a new technique and has been quite thoroughly explored experimentally.[5,6] From such information, and that written in the medical field,[4,1,2,7] as well as personal impressions, the following procedures are considered as possible aids:

1) Restoration of oxygen exchange in the blood stream.
   a) Tracheal intubation.
   b) Immediate administration of positive pressure oxygen.

2) Immediate surgical entrance into the thorax.
   a) Incise midway between fourth and fifth, fifth and sixth, or sixth and seventh ribs. Time should not be taken to prepare the area before incision, because of the nature of the emergency.
   b) Cardiac massage in the average dog can be best accomplished by first incising the pericardium. Active massage of the ventricles can be accomplished by placing the heart between the index and middle fingers on the opposite side and the thumb on the near side. Massage of the heart between fingers of both hands or with one hand and the heart against the thoracic wall are other methods. Massage movements should flow from the apex toward the base to effectively pump blood. A rate of 60 to 100 times a minute should be maintained.

3) Drugs used.
   a) In case of extreme flaccidity of cardiac musculature, cardiac massage, combined with periodic intraventricular injections of epinephrine or similar type agents, can be employed. Epinephrine is an extremely potent drug administered in this manner and should be diluted to 1:10,000 and given in doses of 1 to 4 cc. since ventricular fibrillation can occur

* Dr. John Durr, a postgraduate student in the Department of Small Animal Surgery and Medicine (API), performed a successful cardiac resuscitation after cardiac arrest during experimental diaphragm surgery.

from resulting hypertonicity. Many cardiologists prefer other, less potent agents for use in man.

b) Procaine will reduce excess irritability of the heart, making it less susceptible to ventricular fibrillation. It should also be injected into the right ventricle in 1 to 2 per cent dilutions and in 1- to 5-cc. doses.

4) Defibrillation.[9,10]

Ventricular fibrillation in the dog is a serious matter. Procaine solution may help prevent this condition before or during cardiac massage. Procaine is also used to prepare the heart for shocking (100 volts -2.5 amperes) by using an appropriate device equipped with suitable electrodes applied directly to the heart muscle.[7] Since defibrillators are rarely available, it is of utmost importance that proper massage and medication be employed in an effort to avoid fibrillation.

SUMMARY

1) A case history is presented of a cardiac arrest which occurred during surgical intervertebral disc fenestration and hemilaminectomy. Cardiac resuscitation was employed after a time interval of cardiac failure which was estimated to be longer than five minutes.

2) Anoxemic brain damage had occurred, as manifested by clinical symptoms of a decorticate nature. Within nine days after surgery, the dog's mentality seemed normal but he has retained seriously impaired vision.

3) Radiographically as well as clinically, the heart seemed normal in every respect during the postsurgical observations. The dog had largely recovered from the paraplegia at the time of writing this report (10 weeks after surgery).

4) The literature is briefly reviewed, references to more detailed descriptions are given, and an outline of procedure in cardiac resuscitation efforts are listed as a guide for the practicing veterinarian.

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Artificial Breeding and Breed Improvement

Improvement of the dairy herd is the basic purpose of both the purebred dairy cattle industry and the artificial breeding business. Therefore, the two must cooperate. Two facts which bring this into focus were stressed by the *Guernsey Breeders Journal* (May 15, 1955). They are: (1) the reduced sale for purebred bulls, although there still is an inadequate supply of good proved sires, and (2) the selective matings now offered for purebred breeders by the artificial breeding associations. In 1950, 12.9 per cent of registrations of Holstein-Friesians were artificial insemination calves; in 1953, it was 36.4 per cent.

The proving of bulls must be continued by breeders of purebred cattle but this can be done while still taking advantage of artificial insemination for a portion of their herds. Better sires provided by the artificial insemination program have improved the herds through random breeding but sires should be provided for selective breeding also.

There is also a responsibility for development of the type, the productiveness, and lasting qualities of the offspring. The value of crossing of breeds should also be assessed.

Calf Losses Average 14 Per Cent.—At the University of Kentucky Experiment Station, over a 24-year period including 1,067 calvings, the average loss was 14.43 per cent. The chief causes were abortion, stillbirths, diarrhea, and pneumonia. Of the losses, 84.2 per cent occurred before the calves were 56 days old.—*Prairie Farmer, June 18, 1955.*

Infertility in Ewes from Grazing Clover

In Australia, growing subterranean clover produces sufficient estrogen in the green leaves to interfere with the normal fertility and parturition in ewes. Male sheep and both sexes of other species are unaffected. The wilted plants and hay are safe as are other clovers.

The estrogen content is higher in grazed subterranean clover than in the ungrazed. It may take two or three years of grazing for the lesions (cysts) to develop in the uterine mucosa, so the effect is gradual and progressive but permanent. Fertilizing the land with superphosphate reduces the estrogen production in the plant.—*J. Dept. Agric. South Australia, March, 1955.*

Ectopic Pregnancy in a Dog

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Extrauterine or ectopic pregnancy is known to occur in lower animals, but to judge from the small number of cases reported in the literature, the occurrence of the phenomenon must be infrequent. At the Mayo Foundation Institute of Experimental Medicine, where fairly large colonies of mice, rats, guinea pigs, and other laboratory animals are maintained, ectopic pregnancy was observed in only 1 animal during a period of more than 30 years. In this instance it occurred in a dog. Because of the apparently rare incidence of this condition in animals, the case is reported.

REPORT OF CASE

A black-and-white, smooth-haired, female mongrel Fox Terrier approximately 5 years of age was destroyed at the completion of an experiment. This dog was in good physical condition and apparently was in good health. At necropsy, a firm tissue mass was found in the abdomen; this mass was carefully removed without disturbing the viscera. It was situated on the right side, between the right kidney and the right lateral lobe of the liver, and was firmly attached to the duodenal mesentery and to the lateral abdominal wall on that side. Close examination of this mass revealed an egg-shaped, firm tumor, 10 cm. in length.

Fig. 1—The mummified fetus on the right was contained within the cystlike tissue mass on the left.

When this tumor was incised, it was found to have a fibrous capsule which enclosed a mummified fetus 12 cm. in length. Judging from its bone development, the fetus had developed to term and viability had then ceased. The abdominal aspect of the fetus was partly inverted; hair was seen on the inner surface of the capsule, surrounding the fetus (fig. 1), which was too macerated to permit dissection and identification of organs.

Since this bitch had come from a pound, it was not known if she had given birth to any normal puppies at the termination of the pregnancy in which the extrauterine fetus had developed. The uterus and ovaries appeared to be normal.

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Oxytocin and Sperm Transport.—The increased uterine tone and motility in the cow, which results from the stimulus of mating or of artificial insemination, are caused by the release of oxytocin. Similar results follow the intravenous injection of oxytocin and can be inhibited with adrenaline.—*Vet. Bull., April, 1955.*

Fertility in artificially inseminated hens averaged 83.4 per cent compared with 73.4 per cent for naturally mated birds.—*Vet. Rec., June 18, 1955.*

Ruptured Bovine Ligamentum Nuchae

A partial rupture of the funicular part of the ligamentum nuchae, at the level of the first two or three thoracic spines, was observed during the dissection of an aged Holstein-Friesian cow. No signs had been observed before the animal was destroyed.

Fig. 1—Ruptured ligamentum nuchae of a cow: (1) free ends of ruptured ligament; (2) anterior lamellar part; (3) posterior lamellar part.

On the left side, the rupture was complete and on the right side it involved about three-fourths of the ligament. The lamellar portion of the right ligament having attachment on the spinous process of the first thoracic spine was intact, thus providing some support for the posterior half of the neck.—*W. M. McLeod, D.V.M., Department of Anatomy, School of Veterinary Medicine, Kansas State College, Manhattan.*

Displaced Abomasum and Peptic Ulcer

An Ayrshire cow had an intermittent appetite and failing condition six weeks after calving. Auscultation revealed a peculiar borborygmus-like sound posterior to the left costal arch. The white blood count was similar to that of traumatic reticulitis.

Upon laparotomy followed by necropsy, the abomasum was found lying transversely between the reticulum and rumen, the mesoduodenum had been severed, and the greater curvature of the abmosum was adherent to the diaphragm over an area 3 inches in diameter opposite the middle of the left tenth rib. At this point in the abomasal mucosa was a chronic peptic ulcer 4 by 8 cm., partially perforating the muscular wall. Apparently, the pregnant uterus had pushed the abomasum into its present position, and localized peritonitis over the ulcer produced the adhesion and prevented the abomasum from returning to its normal position after parturition. Borborygmus in the location mentioned was detected in all of the 6 cases of displaced abmomasum which the authors had recognized.—*Vet. Rec., April 30, 1955.*

Unusual Recovery of Engorged Cow

A grade cow which, two days before, had eaten a quantity of ground barley was in a comatose condition with a weak pulse and a fetid liquid diarrhea. After giving 500 cc. of a calcium and glucose (25%) solution intravenously and 8 cc. of amfetamine sulfate, a rumenotomy was done and about 12 gal. of content was removed. A rumen stimulant compound and 6 oz. of aromatic spirits of ammonia were placed in the rumen and a mixture of penicillin (200,000 I.U.), dihydrostreptomycin (200,000 mg.), sulfonamides (76 gr.), and urea (414 gr.) in the peritoneal cavity; the operation was then completed. She was given penicillin (3 million units), and rumen stimulants were left to be given by the owner. The next day she nibbled hay; the third day she was eating fairly well and her bowel movements were normal. She made a satisfactory recovery.—*J. G. Purdy in the Canad. J. Comp. Med., April, 1955.*

Rate of Passage of Ova in the Sow

A study of 18 sows by laparotomy and 15 at necropsy indicated that the ova entered the uterus 24 to 48 hours after ovulation, not 72 hours as believed. The rapid passage may be due to more progesterone from the large number of corpora lutea in this species.—*Vet. Bull., June, 1955.*

Molybdenum Effect on Reproduction

When sodium molybdate was fed to newly weaned rats, the weight gain in both sexes was retarded but more in males than in females. Feeding 80 to 140 p.p.m. of molybdenum caused 75 per cent of the males to be sterile. In the females, fertility and gestation were unaffected but there was interference with lactation.—*Vet. Bull., May, 1955.*

CLINICAL DATA

Studies on Ketosis in Dairy Cattle. XVII. The Value of Hydrocortisone Therapy

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DURING THE PAST few years, cortisone and adrenocorticotrophin have gained wide acceptance as effective treatments for bovine ketosis, especially in cows resistant to previously known treatments. The effectiveness of cortisone and ACTH for the treatment of bovine ketosis was first reported by Shaw *et al.* in 1950 and 1951[1-3] and, more extensively along with studies on hydrocortisone, in 1952 and 1953.[4,5] The effectiveness of cortisone was confirmed by Dye *et al.*[6] and of ACTH by McAuliff *et al.*[7] The latter workers obtained good results with dosages of cortisone and ACTH which were appreciably lower than was recommended by Shaw *et al.*

In early studies on 4 ketotic cows, hydrocortisone acetate appeared to be more effective than cortisone acetate.[4] Later observations in this laboratory, however, indicated that the acetate form of hydrocortisone was not effective for the treatment of bovine ketosis and indicated the need for more information.

The objective of the studies reported herein was to determine the value of hydrocortisone acetate and hydrocortisone, alone and in combination, for the treatment of bovine ketosis. An effort was made to establish the minimum dose which would be effective in most cases, rather than the optimum dose. For example, it was observed in earlier studies that an intramuscular injection of 1.5 Gm. of cortisone acetate was effective for most cases, but that even more rapid and certain recovery could be obtained by using larger doses.[4,8]

EXPERIMENTAL STUDIES

These studies were conducted in the state of Maryland and adjoining areas. In most cases, treatment consisted of a single intramuscular injection of an aqueous suspension of 1.0 Gm. of hydrocortisone. Additional therapy was used only in those cases in which recovery was slow or incomplete. Only cases diagnosed as uncomplicated ketosis were used. A positive diagnosis was usually based on evidence of hypoglycemia, ketonuria, and other signs of ketosis, such as inappetence, lowered milk production, incoordination, rapid loss of weight, and nervous symptoms or lethargy. In an effort to avoid questionable cases, only a 3- to 4-plus urine qualitative reaction was taken to be indicative of primary ketosis. A urine ketone test tablet, made for the medical profession, appeared to be more sensitive and uniform than many of those sold for veterinary use, and was used in lieu of chemical analysis of blood ketones. Blood glucose was determined by the modification of Somogyi.[9]

Of 37 cows with ketosis which were treated with hydrocortisone, 32 received an initial treatment of 1.0 Gm., 2 an initial treatment of 1.5 Gm., and 3 an initial treatment of 0.5 Gm. Thirteen cows with ketosis were treated with hydrocortisone acetate, the initial dosage varying from 0.5 to 1.5 Gm. Ten cows with ketosis were treated with a combination of hydrocortisone acetate and hydrocortisone, 9 of which received 0.75 to 1.0 Gm. of the combination, hydrocortisone constituting 50 per cent in 7 cows and 30 per cent in 2. One cow received 0.25 Gm. of hydrocortisone plus 1.5 Gm. of hydrocortisone acetate.

RESULTS

The results obtained with hydrocortisone are recorded in table 1. Three cows responded and relapsed following the injection of 0.5 Gm. Of the 32 cows which received an initial treatment of 1.0 Gm. of hydrocortisone, 21 made good recoveries without additional treatment, 6 recovered

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Scientific article A495, contribution 2602 of the Maryland Agricultural Experiment Station.

Supported in part by a grant from Chas. Pfizer and Company, Inc., Brooklyn, N. Y.

The authors express their appreciation to the following veterinarians for their cooperation in these studies: Drs. H. L. Baker, Jr., Hagerstown, Md.; W. B. Bixler, Ephrata, Pa.; A. J. Blaney, Centerville, Md.; T. W. Clark, Middletown, Md.; R. C. Flaherty, Easton, Md.; J. H. Hopkins, Hagerstown, Md.; D. R. Lynch and H. E. Schaden, Frederick, Md.; L. H. Taylor, Oxford, Pa.; and D. A. Wiley, Jarrettsville, Md.

following an additional treatment, and the remaining 5 recovered following two to four additional treatments. The 2 cows receiving an initial treatment of 1.5 Gm. exhibited rapid recovery, the urine ketones being negative by the sixth day.

Hydrocortisone generally gave a rapid clinical response as judged by return to normal appetite and appearance, loss of nervous symptoms, decrease of urine qualitative ketone reaction, and return to normal production. Of the 13 cows which were treated with hydrocortisone acetate (table 2), 8 received 0.5 to 0.6 Gm., of which 4 recovered slowly and 4 required additional treatment. Only 1 of 5 which received 1.0 to 1.5 Gm. recovered without additional treatment. The slow clinical response to hydrocortisone acetate is reflected in the comparatively slow increase in the level of blood glucose following its injection.

Nine of the 10 animals treated with a combination of hydrocortisone and hydrocortisone acetate received an initial dose of 0.75 to 1.0 Gm. of total corticoids; the tenth animal received 1.5 Gm. of cortisone acetate plus 0.25 Gm. of hydrocortisone. An excellent clinical response occurred in all cows and additional treatment was not required. The blood glucose response obtained with the combination was greater than that observed following the use of hydrocortisone acetate, but not as great as that obtained with a similar dosage of hydrocortisone alone. The combination appeared to be effective, but additional data must be obtained before it can be stated that a combination of the two holds any advantage over hydrocortisone alone for the treatment of bovine ketosis.

Tables 1 and 2 show that 0.5 to 1.0 Gm. of hydrocortisone alcohol increased glucose a little more than twofold within 24 hours. The 2 cows which received 1.5 Gm. exhibited an increase in blood glucose of more than threefold. Ketotic cows receiving 0.5 to 1.5 Gm. of hydrocortisone acetate, on the other hand, exhibited blood glucose increases of less than 50 per cent within 24 hours, with a further increase taking place slowly over a period of several days.

It is of interest that the cows which showed good recovery following the administration of hydrocortisone (table 1) maintained a high to normal blood glucose value during the entire 16-day observation period. The same was true for the 10 cows (table 2) which responded so well to the combination of the two forms of hydrocortisone. However, the cows which relapsed exhibited hypoglycemia by the fourth to sixth day post-treatment and gradually decreased to lower levels (normal levels are usually 40 to 55 mg./100 ml.). Likewise, the urine ketones were relatively low by the fourth to sixth days post-treatment for the cows which showed good recovery but increased again in the cows which had relapses. The most rapid recovery was observed in the 2 cows which received 1.5 Gm. of hydrocortisone, suggesting that the optimum dose is in excess of 1.0 Gm.

DISCUSSION

The greater activity of hydrocortisone over that of hydrocortisone acetate in the

TABLE 1—Efficacy of Hydrocortisone for the Treatment of Bovine Ketosis

No. of cases		Ave. blood glucose (G) and urine ketones (K) by qualitative test on days post-treatment.* Number of samples in parentheses					
		0	1	2-3	4-6	7-10	11-16
		Treatment: 0.5 Gm. hydrocortisone, good response, re-treatment required					
5	G	29.3(5)	63.3(3)	51.3(3)	.....	.....	.....
	K	3.3(5)	.....	1.0(3)	.....	.....	.....
		Treatment: 1.0 Gm. hydrocortisone, good recovery					
21	G	29.9(21)	66.6(18)	54.8(12)	43.5(10)	39.8(14)	49.6(6)
	K	3.6(21)	3.0(14)	1.6(12)	1.0(10)	0.9(14)	1.0(6)
		Treatment: 1.5 Gm. hydrocortisone, good recovery					
2	G	28.5(2)	108.5(2)	.....	53.0(2)	.....	.....
	K	4.0(2)	4.0(2)	.....	0.0(2)	.....	.....
		Treatment: 1.0 Gm. hydrocortisone, good response, 1 extra treatment					
6	G	24.7(6)	58.3(6)	.....	.....	33.8(6)	26.8(4)
	K	4.0(6)	3.0(6)	.....	.....	2.4(5)	3.5(4)
		Treatment: 1.0 Gm. hydrocortisone, good response, 2 to 4 extra treatments					
5	G	30.8(5)	61.2(5)	49.7(3)	34.8(4)	31.5(4)	29.5(2)
	K	4.0(5)	4.0(3)	1.7(3)	3.0(4)	3.5(4)	3.5(2)

*Data following re-treatment not included in table.

TABLE 2—The Efficacy of Hydrocortisone Acetate and of a Combination of Hydrocortisone and Hydrocortisone Acetate for the Treatment of Bovine Ketosis

No. of cases		Ave. blood glucose (G) in mg./100 ml. and urine ketones (K) by qualitative test on days of treatment and days post-treatment. Number of samples in parentheses					
		0	1	2-3	4-6	7-10	11-16
Treatment: 0.5 to 0.6 Gm. hydrocortisone acetate, slow recovery							
4	G	26.0(4)	37.6(3)	35.0(4)	36.8(4)	42.0(4)	41.7(3)
	K	3.5(4)	3.3(3)	2.8(4)	2.0(4)	1.8(4)	1.0(4)
Treatment: 0.5 to 0.6 Gm. hydrocortisone acetate, re-treatment needed*							
4	G	26.0(4)	33.5(4)	.....	46.5(4)	.....	.....
	K	3.5(4)	3.3(4)	.....	3.3(4)	.....	.....
Treatment 1.0 to 1.5 Gm. hydrocortisone acetate, one slow recovery, others required re-treatment*							
5	G	26.6(5)	30.0(4)	37.4(5)	41.0(4)	49.7(3)	.....
	K	3.8(5)	3.8(4)	3.4(5)	2.8(4)	1.0(3)	.....
Treatment: 0.25 to 0.5 Gm. hydrocortisone plus 0.38 to 1.5 Gm. hydrocortisone acetate, good recovery							
10	G	30.6(10)	52.2(6)	49.0(6)	46.5(6)	43.7(7)	.....
	K	3.9(10)	3.8(6)	2.8(6)	1.2(6)	1.0(7)	.....

*Data following re-treatment not included in table.

treatment of bovine ketosis was to be expected from the report of Porter and Silver,[9] and others, that hydrocortisone has a greater biological activity than hydrocortisone acetate, when injected intramuscularly. The relative potencies observed were also to be expected on the basis of the known solubilities of the various glucocorticoids in blood plasma.[10] Hydrocortisone proved to be appreciably more effective for the treatment of bovine ketosis than cortisone acetate on the basis of previous work on cortisone in this laboratory.[4] It is also apparent that hydrocortisone acetate is appreciably less active than cortisone acetate for the treatment of bovine ketosis. A combination of the quick-acting hydrocortisone and the much slower-acting hydrocortisone acetate may offer some possibilities, however, when used in combination, for decreasing the number of relapses which may occur, particularly when it is necessary to keep the dosage at a minimum for economic reasons. In these studies, no attempt was made to determine the optimum dosage of the combination or of hydrocortisone alone. Based on previous experiences with cortisone acetate, however, it is to be expected that more rapid and certain recoveries can be obtained by using higher doses. The maximum dosage to be recommended will depend in part upon the level which can be used without having an adverse effect on milk production. For example, it was observed that an intramuscular injection of 5 Gm. of hydrocortisone depressed milk production for as long as 16 days.[11] Additional studies on the effect of various levels of glucocorticoids on milk production will be presented elsewhere.

CONCLUSIONS

Hydrocortisone was far more effective than hydrocortisone acetate for the treatment of bovine ketosis and appreciably more potent than cortisone acetate. A combination of hydrocortisone and hydrocortisone acetate appeared to be as effective, and perhaps more effective, than hydrocortisone alone.

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Studies on Ketosis in Dairy Cattle. XVIII. The Value of 11-Ketoprogesterone as a Therapeutic Agent

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It has been reported that 11-ketoprogesterone (ketogestin®) is effective in the treatment of bovine ketosis[1] when administered in dosages similar to those which have been found to be effective for cortisone acetate.[2-4] Although the biological activity of 11-ketoprogesterone has been shown to be much less than that of cortisone or hydrocortisone, in the case of the rat,[5] it appeared advisable to conduct further studies on bovine ketosis to ascertain if there was a species difference.

EXPERIMENTAL

This study was conducted in Maryland. Twenty-eight cows with ketosis were injected intramuscularly with doses of 11-ketoprogesterone varying from 1 to 5 Gm. The precautions taken and the methods used for diagnosis and blood and urine analysis were the same as recorded previously.[6] Since it was observed in previous studies that adrenocorticotrophin and cortisone exert a depressing effect on blood eosinophils of cows, a few observations were made on the effect of 11-ketoprogesterone upon the blood eosinophils of both normal and ketotic cows. Blood glucose levels were determined also.

RESULTS

The data are given (table 1) on the effect of intramuscular injections of 2 to 4 Gm. of 11-ketoprogesterone upon the blood glucose and eosinophils of 2 normal and 2 ketotic cows. There was an appreciable decrease in eosinophils in both the normal and ketotic cows, but the decrease was of a much lesser magnitude than was observed previously in this laboratory.[3,4] The blood glucose levels of the normal cows were not affected, but an increase did occur in the ketotic cows within 24 hours.

Of 28 cows treated with 1 to 5 Gm. of 11-ketoprogesterone (table 2), 13 recovered without additional treatment. A breakdown of these figures shows that of the 17 animals which received 1 to 3 Gm. of 11-ketoprogesterone, 7 recovered without additional treatment; whereas, of the 11 animals which received from 4 to 5 Gm., 6 recovered. The data show that 11-ketoprogesterone, in the dosages used, did increase the blood glucose of ketotic cows. However, the increase in blood glucose was not as great as that which is usually observed from a similar or lesser dosage of either cortisone acetate or hydrocortisone.[2,6]

Also (table 2) the average blood glucose of the two groups which exhibited good recovery (groups 1 and 3) was maintained at normal levels after the second and third days, whereas the average blood glucose levels of the two groups which required additional treatment was lower on the second to third days and, in the case of group 4, still lower on the fourth to sixth days. Glucose values for group 2 are not included in the table beyond the third day, since these animals were re-treated by that time because of poor clinical response. Furthermore, the average urine ketones of the cows which recovered following the initial treatment were lower on the second to third days and thereafter than in the case of the cows which required additional treatment.

TABLE 1—The Effects of Intramuscular Injections of 11-Ketoprogesterone on Blood Glucose and Eosinophils

Cow	Treatment	Blood glucose (mg./100 ml.) Initial	Blood glucose (mg./100 ml.) 24 hr.	Blood eosinophils (per cmm.) Initial	Blood eosinophils (per cmm.) 24 hr.
	Normal cows				
Elinor	2 Gm. 11-keto-progesterone	55.4	59.3	1,099	616
Clara	3 Gm. 11-keto-progesterone	50.1	54.1	2,275	1309
	Cows with ketosis				
R-K	4 Gm. 11-keto-progesterone	20.0	35.8	877	477
C-K	2 Gm. 11-keto-progesterone	26.0	36.0	366	277

From the Dairy Department, Maryland Agricultural Experiment Station, College Park.

Scientific article A496, contribution 2603 of the Maryland Agricultural Experiment Station.

Supported in part by a grant from the Upjohn Company, Kalamazoo, Mich.

The authors express their appreciation to the following veterinarians in Maryland for their cooperation in these studies: Drs. A. J. Blaney, Centerville; T. W. Clark, Middletown; R. C. Flaherty, Easton; and D. R. Lynch, Frederick.

These general observations on blood glucose and urine ketones are similar to those noted when hydrocortisone was used.[6]

TABLE 2—Efficacy of 11-Ketoprogesterone for the Treatment of Bovine Ketosis

Group	No. of cases		Ave. blood glucose (G) in mg./100 ml. and urine ketones (K) by qualitative test on days post-treatments.* Number of samples in parentheses				
			0	1	2-3	4-6	7-10
Treatment: 1 to 3 Gm., good recovery							
1	7	G	21.6(7)	.....	45.4(7)	53.6(5)	44.8(5)
		K	3.6(7)	.....	2.6(7)	1.2(5)	0.8(5)
Treatment: 1 to 3 Gm., re-treatment required							
2	10	G	50.5(10)	38.8(6)	38.8(9)	.....	.....
		K	3.9(10)	3.5(6)	3.7(9)	.....	.....
Treatment: 4 to 5 Gm., good recovery							
3	6	G	27.0(6)	29.8(4)	44.0(6)	42.5(6)	46.0(4)
		K	3.8(6)	4.0(4)	2.0(6)	1.0(6)	0.8(4)
Treatment: 4 to 5 Gm., re-treatment required							
4	5	G	32.2(5)	36.8(4)	41.3(3)	38.0(4)	.....
		K	4.0(5)	3.5(4)	3.7(3)	2.5(4)	.....

*Data following re-treatment not included in table.

There is the suggestion that 11-ketoprogesterone may be somewhat slower in action and perhaps somewhat longer-acting than some of the glucocorticoids which have been employed previously, especially when the lower glucocorticoid activity is taken into consideration.[5] This is indicated by the fact that although there was only a moderate increase in the average blood glucose values during the first 24 hours, this level of blood glucose was maintained or increased for several days thereafter. A combination of 11-ketoprogesterone and a more potent and quick-acting corticoid, such as hydrocortisone,[5] may offer some promise for the treatment of bovine ketosis.

SUMMARY

Of 28 cows with bovine ketosis treated with 1 to 5 Gm. of 11-ketoprogesterone, 13 recovered without additional treatment. In most cases, the blood glucose and clinical response was less than that usually obtained from similar or lesser dosages of cortisone acetate.

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International Entomology Congress

The Tenth International Congress of Entomology will be held in Montreal from Aug. 17 to 25, 1956. The meetings will be held at McGill University and the University of Montreal. Fifteen provisional sections have been arranged including one on medical and veterinary entomology. Symposiums will also be held in many sections. Those wishing to receive further information, including membership fees, application forms, etc., are requested to apply to the secretary, Mr. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont.

Migraine and Leptospirosis.—That migraine may sometimes be a sequel to *Leptospira icterohaemorrhagiae* infection (Weil's disease) is indicated in a study of 50 men who formerly had this disease. Migraine occurred in 48 per cent of this group and in only 12 per cent of a control group. The migraine may result from the meningitis which is often a feature of this infection.—*Brit. M. J., April 23, 1955.*

Some Clinical and Microbiological Observations on Four Cases of Canine Blastomycosis

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NORTH AMERICAN blastomycosis is not a rare affection in man, but only recently has this malady in the dog attracted much attention. The increasing number of reports indicate that the incidence of canine blastomycosis in the United States is probably greater than realized.

It was first described by Meyer[1] in 1912. In 1952, Ramsey and Carter[2] tabulated the 16 reported cases. In 1954, Menges *et al.*[3] reported 7 additional cases (4 proved and 3 suspect) and, more recently, Robbins[4] summarized the literature on canine blastomycosis in the United States and added 3 cases.

Canine blastomycosis is a chronic infectious disease caused by the fungus, *Blastomyces dermatitidis*, and is characterized by granulomas most frequently observed in the lungs and skin but, also, occasionally in other tissues. The most common symptoms are dyspnea, chronic cough, lethargy, emaciation, fever, subcutaneous abscesses, and cutaneous ulcers.

This report describes 4 additional spontaneous cases, with particular reference to 1 which was diagnosed antemortem by histological examination of an affected lymph node. This animal was observed for ten days, and *B. dermatitidis* was also recovered following euthanasia.

CASE REPORTS

Case 1.—A 4½-year-old female Beagle, from Sylacauga, Ala., had exhibited respiratory difficulty for approximately ten days when presented to the Small Animal Clinic, Alabama Polytechnic Institute, on Nov. 3, 1954. Its skin was dry and a draining fistulous tract involved the right popliteal lymph node. There were conjunc-

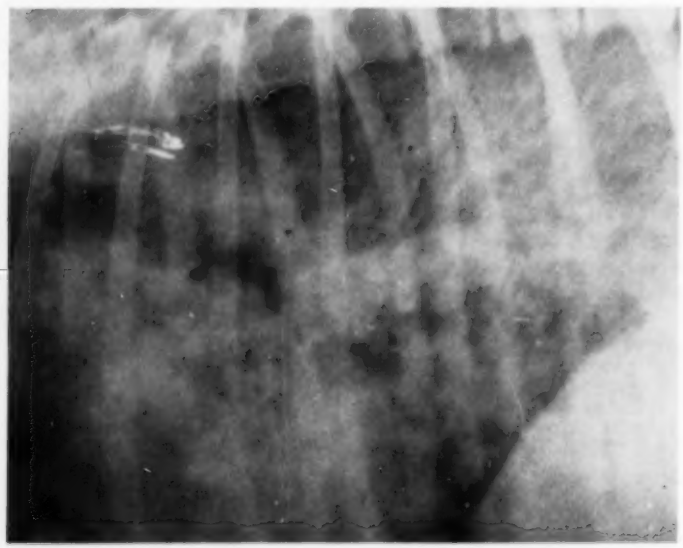

Fig. 1—Radiograph of the lungs of a Beagle (case 1) with blastomycosis. Note the diffuse consolidation in all areas.

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Approved by the Committee on Publications, School of Veterinary Medicine, Alabama Polytechnic Institute, publication No. 510.

tivitis and marked congestion of the tonsils but the nasal and oral cavities were apparently normal. Radiographs of the lungs (fig. 1) revealed diffuse consolidation in all lobes. Clinical laboratory findings were:

Red blood cells	6,500,000
White blood cells	43,100
Neutrophils	93
(45% immature forms)	
Lymphocytes	4
Eosinophils	3

Sedimentation rate, 40 mm. in half an hour
58 mm. in one hour

Blood urea nitrogen, 7.5 mg./100 cc.

Biopsy of the right popliteal lymph node revealed a granulomatous lesion which contained numerous budding fungi morphologically characteristic of *B. dermatitidis*.

Aureomycin®* (80 mg. daily) was given intravenously for four days. Subsequent radiographs of the lungs showed that the pathological condition was steadily advancing. Since the animal's condition progressively worsened, euthanasia was performed ten days following admission.

*Aureomycin is a trademarked product of Lederle Laboratories, Pearl River, N. Y.

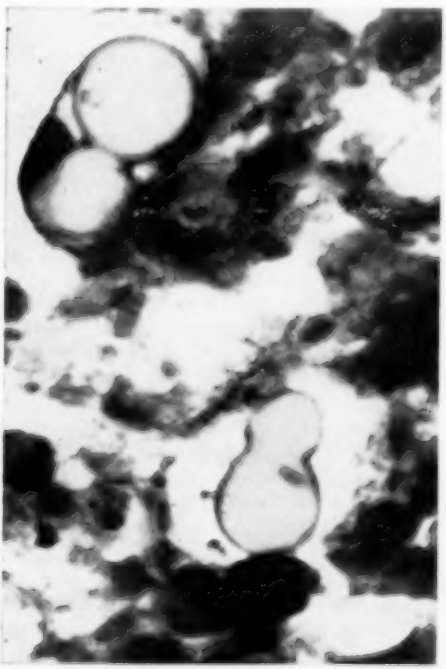

Fig. 2—Budding Blastomyces dermatitidis organisms in a lymph node of a Beagle (case 1). Hematoxylin and eosin stain. x 2,100.

Fig. 3—Filamentous colony of Blastomyces dermatitidis on Sabouraud's medium incubated at 25 C. The growth appeared eight days following inoculation.

Necropsy.—The prescapular and left popliteal lymph nodes were enlarged. The lungs were partially solidified with numerous discrete and confluent grayish miliary lesions. The trachea and bronchi contained mucopurulent exudate. The bronchial lymph nodes were enlarged and contained scattered small necrotic areas. There were several small nodular hemorrhagic lesions on the bicuspid valve, and slight calcification of the auricular endocardium and the laryngeal mucosa.

Histopathology.—Examination of the brain, lungs, liver, spleen, kidneys, bladder, lymph nodes, heart, and trachea revealed infection only in the lungs and the bronchial and popliteal lymph nodes. The lesions were granulomatous in nature and, with minor variations, were similar in histological detail in each of the three locations. The larger lesions were formed by coalescence of two or more adjoining nodules.

The individual nodules were characterized by circumscribed accumulation of epitheloid-type histiocytes arranged in circular fashion. Lymphocytes, lesser numbers of macrophages, and an occasional giant cell were also present. The lymphocytes tended to concentrate toward the periphery of the nodule. In a majority of the nodules, there was a rarefied central area which contained a small amount of pus. Also, in other nodules, especially those in the lymph nodes, the cellular content of the central

Fig. 4.—Cotton blue mount of mycelial phase Blastomyces dermatitidis. Note the round, oval, and pyriform conidia. x 1,375.

areas was necrotic. All granulomatous lesions contained numerous budding fungi characteristic of *B. dermatitidis* (fig. 2).

There was also moderate bronchopneumonia. Some bronchioles that had not been completely replaced by granulomatous lesions contained exudate in which the predominant cells were polymorphonuclear leukocytes.

Microbiology.—Suspensions from tracheal exudate, the bronchial and left popliteal lymph nodes, and the lung tissue proper were made in 20 per cent sodium hydroxide. Direct microscopic examination of the respective suspensions revealed numerous large, spherical to oval, single-budding, thick-walled, yeastlike forms. Material from the same sources was cultured on bovine blood agar, brain-heart infusion agar, and Sabouraud's dextrose agar. Duplicate plates were incubated at 25 C. and 37 C. Minute filamentous colonies (fig. 3) appeared in eight days on Sabouraud's dextrose agar at 25 C. and yeastlike colonies developed at 37 C. at about the same time. No growth occurred on other mediums.

Microscopic examination of the filamentous growth revealed septate hyphae bearing numerous pyriform-to-round conidia, 3 to 4 μ in diameter, attached to the hyphae, and on sterigmata (fig. 4). The appearance was typical of *B. dermatitidis* as described by Conant *et al.*[5]

The yeastlike colonies contained single budding cells. As these colonies became older, they tended to become prickly and finally developed a white cotton-like aerial growth typical of the filamentous form.

Efforts to convert the mycelial form of the fungus to the yeast form by inoculation of fresh mediums and incubation at 37 C. were not successful.

Case 2.—A 7-year-old male Foxhound in a state of general debility and with a fractured right mandible was sent, from Eufaula, Ala., to the Small Animal Clinic for euthanasia on Jan. 22, 1953.

Necropsy revealed several scattered small bony nodules in the lungs. The pathological fracture of the right mandible apparently resulted from a large ulcerous lesion involving the bone. There was also a small polyp in the urinary bladder.

Histological examination showed that the lesion involving the bone was a fibrosarcoma; the bladder polyp was a carcinoma of low grade malignancy; and the bony nodules in the lungs were heterotopic bone of undetermined cause. The lung section also contained a solitary circumscribed granulomatous nodule, approximately $\frac{1}{8}$ inch in diameter, in which budding fungi morphologically characteristic of *B. dermatitidis* were seen.

Case 3.—A small specimen of lung from a 3-year-old male Pointer, suspected of having a malignant lymphoma, was submitted without other necropsy findings to the Department of Pathology from Amory, Miss., on July 27, 1953. It was studded with numerous miliary, grayish white nodules which proved to be granulomatous nodules containing numerous budding fungi characteristic of *B. dermatitidis*.

Case 4.—A cutaneous, tumor-like mass from a digit of a 2-year-old male Beagle was submitted from Kentwood, La., on Oct. 23, 1953. Similar growths were reported on the digits of three feet. There was generalized lymphadenopathy and a slightly elevated temperature, yet the animal had maintained a good appetite.

Histopathological examination of the specimen revealed granulomatous nodules containing budding fungi morphologically characteristic of *B. dermatitidis*.

DISCUSSION

Case 1, which afforded an unusual opportunity for clinical observation, with radiographs and other laboratory procedures, in a known case of canine blastomycosis, gave some indications that aureomycin therapy may actually have augmented the disease process. Although favorable response to stilbamidine and 2-hydroxy-stilbamidine has been reported[6,7] in cases of blastomycosis in man, treatment generally is not recommended in the dog because of the danger that the disease may be transmitted from dog to man.

Case 2 is of interest in that it represents an incidental, localized, apparently nonfatal pulmonary infection with *B. dermatitidis*.

SUMMARY

1) Four additional cases of canine blastomycosis are reported, 2 from Alabama, 1 from Mississippi, and 1 from Louisiana.

2) Two dogs had the systemic type of infection with extensive pulmonary involvement. One of these was observed clinically for ten days following diagnosis by biopsy of an affected popliteal lymph node.

3) One dog had localized, nonfatal pulmonary infection.

4) One dog had cutaneous infection with generalized lymphodenopathy. The status of the lungs was not determined.

5) The breeds involved were: 2 Beagle hounds (1 male and 1 female), 1 male Foxhound, and 1 male Pointer.

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Distribution of Three Mycoses

The geographical distribution of systemic mycoses are of interest since there seems to be natural boundaries for these diseases. Histoplasmosis, coccidioidomycosis, and blastomycosis are reported sporadically elsewhere but their true endemicity has been demonstrated only in the United States.

A six-month study of blastomycosis shows that it is rare or absent in the South and the West and most common in the north and northeast sections of the United States. The reason for this peculiar distribution is unknown.

Coccidioidomycosis and histoplasmosis were rarely found until recent studies demonstrated their frequent presence as mild primary infections.

Coccidioidomycosis is limited largely to the arid areas from western Texas to the Central Valley of California. Histoplasmosis is confined to the central United States, including the southern parts of Iowa and Illinois, Indiana, western Ohio, Kentucky, Tennessee, Missouri, and northeastern Kansas. Many cases of infection are found in the Kansas City area but they are rare in western Kansas.

The transmission of mycoses evidently is not directly from one individual to another. The spores of the fungus of coccidioidomycosis and histoplasmosis become airborne and are inhaled, setting up a pulmonary infection. A similar transmission is suggested in blastomycosis.

The epidemiology of these diseases is indicated by their focal appearances. For instance, a small group of children developed coccidioidomycosis after digging a hole in the desert sand.

Histoplasmosis has developed after visits to such places as storm cellars, barns, or hollow trees, indicating that the soil or other substances in nature are sources of infection.

General hygiene seems to furnish little protection against the fungous diseases, whereas it is of great importance in bacterial diseases such as tuberculosis. Racial factors are important, particularly in coccidioidomycosis, the disease being much more serious in the dark-skinned races. These diseases, particularly blastomycosis, are more common in the male sex.—*Am. J. Clin. Path., March, 1955.*

Losses in Newborn Lambs Associated with Bluetongue Vaccination of Pregnant Ewes

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BLUETONGUE is a virus disease affecting sheep primarily. The disease was identified in California in 1952,[1] became widespread there in 1953 and appeared again in 1954. By December, 1954, bluetongue had appeared in ten western and midwestern states.

A modified live virus vaccine was produced by McKercher, McGowan, and Saito,[2] using the chicken embryo method developed in South Africa. The vaccine was released for field use July 12, 1954. It was used immediately and extensively in California, especially in the Sacramento and part of the San Joaquin valleys where bluetongue had been prevalent. It was also used in some flocks in Riverside County and one large flock in Santa Barbara County, both quite a distance from the above valleys.

Rams had been placed with the ewes in May or June; therefore, many ewes were in various stages of pregnancy at the time of vaccination. During the fall of 1954, soon after lambing started, many sheepmen reported losses in newborn lambs. These reports came only from ranches where the ewes had been vaccinated against bluetongue, including reports from Riverside and Santa Barbara counties.

The trouble was shown in various ways. Although the lambs were born at full term: (1) some were stillborn; (2) others were spastic and lay struggling until death; (3) some appeared dumb, walking with their heads down, ignoring their dams, pushing their heads through fences or into corners, not nursing unless helped (the sheepmen called them "dummies" or "crazy lambs"); (4) some were born normal while their twin was either a "dummy" or born dead a few days later; (5) some were small and putrified, some were deformed, while others were dead and edematous with abdominal cavities distended with fluid; and (6) a few which appeared normal and were put on the range were, in ten to 14 days, found to be blind or dumb.

Upon necropsy, the brains of some of the affected lambs showed hypoplasia, with the cranial cavity filled with a clear fluid; others had normal-sized brains which showed inflammation or hemorrhages on the surface and, on histopathological examination, degeneration of the tissue. Some lambs had an excess of pericardial fluid, and hemorrhages were occasionally found on the heart and thymus. Laboratory examination failed to show any evidence of bacterial or virus infection being, or having been, present.

Histologically, the cerebellum showed degeneration, with loss of Purkinje cells in some areas and cell infiltration. Submeningeal edema was also observed (fig. 1). The cerebrum showed congestion and submeningeal infiltration (fig. 2) but no perivascular cuffing was seen.

Bacteriologically, no pathogens were recovered although heavy suspensions of brain tissues were seeded on appropriate mediums.

In chicken embryo inoculation trials, when suspensions of brain tissue of affected animals from four ranches were inoculated into 8-day-old embryos, the results of one passage indicated the absence of infective agents.

In animal inoculation trials, guinea pigs were unaffected when injected intraperi-

TABLE 1—Survey of Some of the Vaccinated Flocks Showing Most of the Affected Lambs to Be from Ewes Four to Eight Weeks Pregnant when Vaccinated

No. of flocks	No. of ewes	Remarks
99	171,278	Not vaccinated, lambs normal.
4	1,065	Pregnant under 50 days when vaccinated, lambs normal.
2	1,450	Pregnant 4 to 11 weeks when vaccinated, lambs normal.
2	1,050	Pregnant 7 to 11 weeks when vaccinated, lambs normal.
12	41,000	Pregnant 10 weeks or longer when vaccinated, lambs normal.
18	3,510	Vaccinated 1 to 10 weeks before breeding, lambs normal.
29	41,760	Pregnant 1 to 10 weeks when vaccinated; 2,124 lambs affected.

Field veterinarian (Shultz) and livestock pathologist (DeLay), Bureau of Livestock Disease Control, Division of Animal Industry, California State Department of Agriculture, Sacramento.

toneally with 0.3 ml. of the excessive pericardial fluid from a number of the affected animals.

Twelve-week-old chicks remained unaffected when exposed to suspensions of the brains of affected lambs, 6 chicks receiving 0.25 ml. of the suspensions intramuscularly, and 6 being exposed by swabbing the tracheas with brain suspension.

A survey (table 1) of many vaccinated flocks showed that nearly all of the affected lambs were from ewes which were four to eight weeks pregnant when vaccinated.

The usual report was that at the start of lambing all lambs were normal. However, as lambing approached for ewes which were pregnant eight weeks at the time of vaccination, the losses started and the percentage of lambs affected increased for about two weeks. The losses then decreased and ended in about two more weeks. Almost without exception, the peak was reached during the lambing of the ewes which had been five or six weeks pregnant when vaccinated.

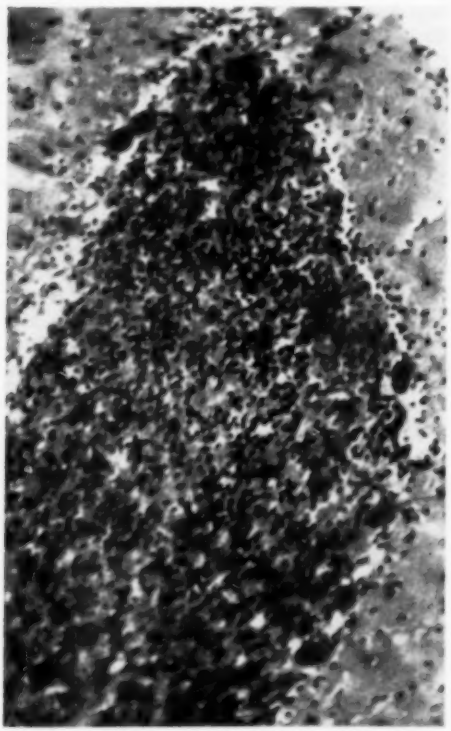

Fig. 1—Cerebellum of a lamb showing degeneration, loss of Purkinje cells, in some areas, cell infiltration, and submeningeal edema. x 120 plus enlargement approximately x 2.

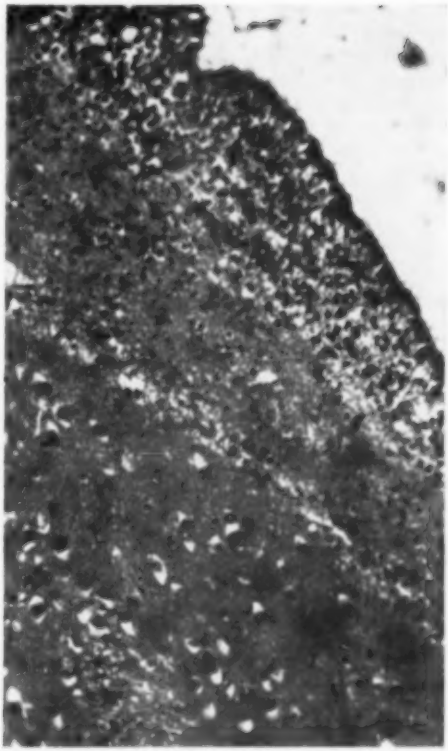

Fig. 2—Cerebrum of a lamb showing congestion and submeningeal infiltration. x 120 plus enlargement approximately x 2.

During the period of highest losses, the percentage of affected lambs on some ranches was over 50 per cent. Losses varied from less than 1 per cent to more than 13 per cent of the lamb crop with an average of about 5 per cent.

There are similarities between this condition and the fetal abnormalities which occur in pigs from sows vaccinated with modified live hog cholera virus at ten to 16 days of gestation.[3] Also, macroscopic lesions in the brain somewhat resemble those of acute enzootic ataxia and copper deficiency of sheep in western Australia.[4]

South African veterinarians report that they routinely vaccinate ewes which are pregnant one to three months and do not have this trouble.[5]

In some flocks, a retarded lambing rate was observed for two to four weeks about five months after vaccination. This might indicate that a vaccination reaction had interrupted the normal heat periods of the ewes or caused a temporary sterility of the rams. Also, a few owners reported visible vaccination reaction in feeder lambs, with their gains being retarded.

Because of the above difficulties and since sunshine, which intensifies the symptoms of bluetongue,[6] may also affect vaccinated sheep, it would be best to vaccinate as early in the spring as possible and three weeks or longer before breeding. This has also been recommended by others.[7]

SUMMARY

Losses in newborn lambs are reported in flocks in which ewes were four to eight weeks pregnant at the time of vaccination against bluetongue.

Infection was proved absent by histological, bacteriological, and animal inoculation trials.

The greatest pathological changes were in the cerebellar and cerebral tissues.

The fetal lambs were apparently most susceptible to the modified virus vaccine during the fifth and sixth weeks of gestation.

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Subclinical Canine Distemper with Renal Toxoplasmosis

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Methods of transmission and reservoirs of infection are important questions regarding toxoplasmosis in man and domestic animals. Development of knowledge on these points will help elucidate the epidemiology and epizootiology of this disease. The object of this report is to describe a case of canine toxoplasmosis with renal involvement and with Toxoplasma in the renal tubules where they could be excreted in the urine.

On Sept. 14, 1954, a 5½-month-old male Collie was admitted to the small animal clinic (A.P.I.) with symptoms suggestive of distemper. The symptoms mentioned by the owner were sluggishness, coughing, anorexia, and slight incoordination of the hind legs. Examination revealed a temperature varying from 102.2 to 103.0 F., ocular and nasal discharge, and an anemic oral mucosa. Coccidia and hookworm eggs were observed on fecal examination. The animal was treated as an out-patient for ten days with penicillin, streptomycin, thiamine chloride, and anthelmintic therapy. At the end of this period, the dog appeared normal, and the owner insisted on distemper vaccination. Avianized vaccine was administered. Approximately three weeks later, the dog again was admitted to the clinic with the original symptoms. Despite antibiotic therapy, parenteral alimentation, and supportive treatment administered for nine days, the dog became debilitated and was destroyed on October 27.

The carcass was in poor condition. On necropsy, small, dark reddish gray areas of partial consolidation, suggestive of the virus-type pneumonia often associated with distemper, were found throughout the lungs. No other remarkable alterations were seen.

On routine histopathological examination, the brain showed slight but characteristic postdistemper changes consisting

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Approved by the Committee on Publications, School of Veterinary Medicine, Alabama Polytechnic Institute, publication No. 513.

of a few small foci of demyelination in the cerebellar white substance and in the submeningeal region of the cerebral peduncles. There also were numerous scattered foci of recent inflammation, especially in the cerebral gray substance, consisting of mobilized microglia cells and a few leukocytes. Organisms morphologically characteristic of *Toxoplasma gondii* were seen in several of the latter type lesions.

The lung tissue failed to show Toxoplasma organisms or inflammatory edema characteristic of toxoplasmosis. A "dry" pneumonic reaction around some of the bronchioles consisted of partial consolidation of the alveoli with large mononuclear cells and lesser numbers of leukocytes. A few of the mononuclear cells contained eosinophilic cytoplasmic inclusions characteristic of distemper. Pulmonary changes were similar to those frequently seen in mild cases of distemper without secondary bacterial infection of the lungs. The liver showed numerous small inflammatory, necrotic foci. Many of these lesions contained bodies morphologically characteristic of Toxoplasma.

The kidney section showed an unusual type of nephritis. There was extensive patchy infiltration of plasma cells and lesser numbers of lymphocytes in the cortex, without fibrosis or glomerular changes (fig. 1). In some areas between the tubules there were peculiar giant cells morphologically suggestive of a fusion of plasma cells rather than large mononuclear cells. Some tubules in the infiltrated areas showed evidence of epithelial regeneration presumably a result of previous degeneration of the epithelial lining. Numerous tubules, particularly the convoluted tubules, contained necrotic desquamated epithelial cells and cellular debris. A few tubules contained erythrocyte debris. In the single histological section examined, there were structures morphologically characteristic of Toxoplasma in 14 different locations, either within degenerated epithelial cells lining the proximal convoluted tubules (fig. 2) or lying free in the tubular lumens (fig. 3). No Leptospira were seen in an appropriately stained duplicate section.

A portion of bladder mucosa showed two epithelial cells containing Toxoplasma colonies. These cells were located deep in the mucosa, adjacent to the basement membrane. A few small foci of leukocytic infiltration in the bladder wall showed no Toxoplasma. No distemper inclusions were found.

Fig. 1—Kidney cortex showing infiltration of lymphocytes and plasma cells (circle) without fibrosis or glomerular changes. x 100.

Thus the histopathological examination

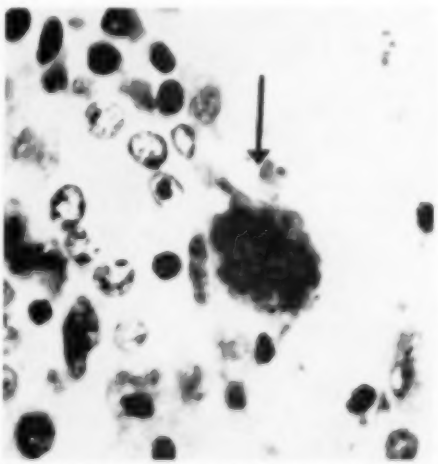

Fig. 2—Structures characteristic of Toxoplasma (arrow) within degenerated epithelial cell of convoluted tubules of the kidney. x 700.

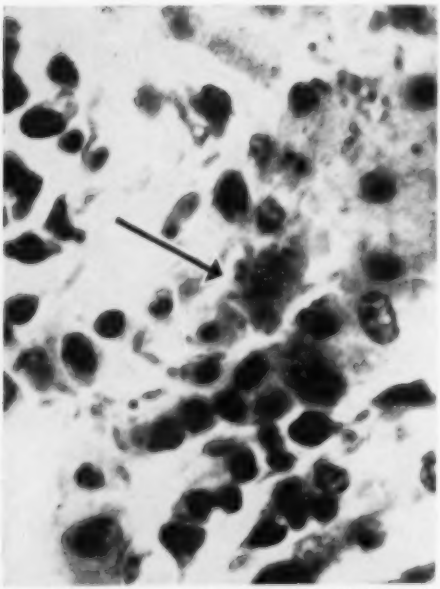

Fig. 3—Toxoplasma in degenerated epithelial cells (arrow) lying in lumen of renal tubules. x 825.

revealed lesions of toxoplasmosis containing organisms in the brain, liver, and kidneys along with residual lesions of distemper in the brain and lungs. Apparently, the dog first had distemper, from which it made a clinical recovery, the subsequent illness being toxoplasmosis.

Discussion.—Demonstration of Toxoplasma in the kidneys of affected dogs, either by mouse inoculation or by histological examination, has been reported by several authors.[1-7] Finding the organisms in epithelial cells either lining the convoluted tubules or desquamated into the tubular lumens demonstrates the possibility that the disease might be spread by the urine; also, the possibility of a renal carrier state of toxoplasmosis in the dog. Renal carrier states of leptospirosis and infectious canine hepatitis occur in dogs.[8,9] The Leptospira organisms persist in the renal tubules where they apparently are protected from antibodies circulating in the blood stream. In infectious canine hepatitis, there is morphological evidence that the virus persists in the renal epithelium, where presumably there is sufficient protection from circulating antibodies to permit survival and multiplication of the virus.[10] The histopathological details of this case suggest that the same situation might occur in dogs that survive the systemic phase of toxoplasmosis. Even so, this dog can not be considered to have become a renal carrier of toxoplasmosis because the systemic infection had not abated, as indicated by the presence of Toxoplasma foci in the liver and brain. However, the renal changes described indicate the desirability of further study of the renal pathology of toxoplasmosis in dogs.

Summary.—After euthanasia due to a recurrence of symptoms following a previous attack of distemper, a dog was found to have lesions of toxoplasmosis in the brain, liver, and kidneys. Toxoplasma organisms were demonstrated in the brain, liver, and epithelium of the renal cortex. The possibility that cases like this could develop into renal carriers of toxoplasmosis is discussed.

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Toxoplasma infection is apparently transmitted between pigs and rodents much as is trichinosis.—*Vet. Bull., June, 1955.*

Detection of Crop Mycosis (Moniliasis) in Chickens and Turkey Poults with a Panendoscope

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EARLY AND POSITIVE diagnosis was recognized as a principal problem in the experimental transmission of crop mycosis (moniliasis) in chickens and turkeys. Methods using samples from the crop or feces were not reliable because the causative fungus, *Candida albicans*, may be found in these locations as a nonpathogenic resident. Therefore, recovery of the fungus from crop or fecal samples can not be considered as diagnostic evidence that internal lesions of disease exist.

Since the purpose of transmitting the infection to chickens and turkeys experimentally was to test and evaluate alleged treatments for the disease, slaughter and necropsy methods could not be used as a diagnostic aid.

In reviewing the problems of diagnosis, it appeared that the development of a direct method of examination of the crop mucosa in the live bird was the best solution. It was reasoned that, since the fungus colonies were clearly visible on the crop mucosa at necropsy, they should be equally visible in the live bird, provided the crop mucosa could be viewed by some mechanical means.

For this purpose, a McCarthy's foroblique panendoscope was obtained (fig. 1). This instrument is similar in type to those used for human urological examinations. It is equipped with a viewing lens and an independent light source. The cannula portion is oval, measuring 5/16 inch in diameter and approximately 10 inches in length.

On preliminary trial, it was learned that the instrument could be passed readily through the mouth and into the crops of chickens as young as 4 weeks of age and of turkey poults at 3 weeks of age.

Before crop examination, the birds were placed in cages having wire mesh floors and all feed and water was removed for eight to 12 hours, which is usually sufficient to empty the crop and allow a clear view of the crop mucosa.

Photograph by H. E. Zimmerman

Fig. 1—A McCarthy's foroblique panendoscope with independent light source.

To make the examination, an assistant must hold the body of the bird with one hand, and with the other extend the head toward the operator. The operator squeezes the beak open and slowly passes the cannula of the instrument into the mouth, down the esophagus, and into the crop (fig. 2). Gentle resistance is felt when the tip of the cannula reaches the bottom of the crop. At this time, the light is turned on and adjusted by a rheostat for desired brightness. A gentle up and down motion, combined with a rotary movement, is used to examine the mucosa of the crop. The mucosa of the empty normal crop appears to be a light pink and has a glistening smooth surface which may have numerous shallow convolutions. At necropsy, the normal mucous surface of the crop will be similar, to that of a live bird, the chief difference being that the color of the mucosa is a deeper pink in the live bird.

In the fungus-infected crop, variations from severe corrugations to mild whitish streaks, erosions, or diphtheritic formations may be observed, and the color of the surrounding mucosa may be a deep red.

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Grateful acknowledgment is made to Dr. F. A. Hodges, Division of Microbiology, Food and Drug Administration, for the identification of the organisms isolated from crop lesions; and to Mr. Harry E. Zimmerman and Mr. L. G. Comparetto, of the Food and Drug Administration, for the illustrations in this paper.

—Photograph by H. E. Zimmerman

Fig. 2—An inspection of the mucosa of the crop of the chicken is being made with the panendoscope inserted into the crop.

In crops experimentally infected with *C. albicans*, the lesions were generally mild (fig. 3). They consisted chiefly of areas of mild diphtheritic membrane formation having irregular borders, or they appeared in the form of white streaks or patches along the tops of the convolutions. Many of the lesions assumed the form of a white, conical or elevated mass, about the size of a grain of wheat, located on the mucosa and apparently having little or no attachment. In some cases, there were loosely hanging shreds of tissue with eroded patches on the mucosa. In the milder forms of the disease, the mucosal changes in the crop were not accompanied by inflammation or other visible pathological changes. An excess of mucous shreds or flakes, appearing as white patches, may be seen in the infected crop. These may cling to the end of the examining instrument and coagulate on the tip of the light bulb making frequent cleaning necessary.

—Photograph by L. G. Comparetto

Fig. 3—The mucosa of a chicken crop experimentally infected with Candida albicans.

When making an internal inspection of the crop, it is helpful to palpate it from the outside with the free hand. This causes changes in the contours of the crop mucosa. The reflections of light on the surface angles resulting from these contour changes assist in the study of outline.

Chief among the factors that may cause an erroneous positive diagnosis of fungus in the crop are residual feed particles. Ground grain of a white or yellow color may occasionally be mistaken for a fungus colony on the mucosa. Usually, withdrawal of the examining instrument and flushing the crop with about 10 cc. of water from a pipette will remove any remaining particles of feed. Re-examination a few minutes later will show that the particles, if they are feed, have disappeared or have changed position.

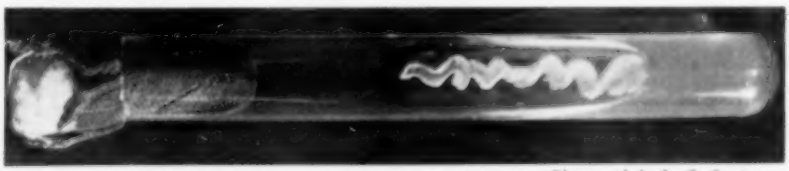
The posterior aspects of the mouth and the entire esophagus may be examined with comparative ease during insertion or withdrawal of the instrument.

It is important that the assistant should be alert for evidence of choking in young birds during this examination. Some birds have a tendency, voluntarily or otherwise, to suspend breathing with passage of the instrument. When it is observed that the bird has stopped breathing and is becoming limp, the instrument should be quickly withdrawn. The bird will revive almost immediately and the instrument can be reinserted to complete the examination.

In all cases, the examination should be conducted as quickly and gently as possible. With some experience and in the

presence of well-established fungus colonies of the crop, an operator can make a positive diagnosis in less than one minute of observation.

covery of the organism. Figure 4 is a 48-hour culture of *C. albicans* growing on a Sabouraud's agar slant. This culture was isolated from one of the described lesions.



—*Photograph by L. G. Comparette*

Fig. 4—Candida albicans growth on Sabouraud's agar slant.

In actual use, this method of examination has proved 75 to 90 per cent accurate on experimentally infected birds. However, lesions produced in this manner are usually mild, take longer to diagnose, and have a higher percentage of almost invisible lesions. It is the light infections with diffuse or pinpoint lesions which may cause a variation in the efficiency of observation. The percentages given here were confirmed by slaughter and necropsy of the examined birds, culture of the crop lesions, and re-

This method has proved to be of considerable practical value by being sufficiently accurate to justify its use as a diagnostic agent, particularly for young birds.

Further work is necessary to determine the incidence and economic importance of crop mycosis (moniliasis) in birds. It is hoped that this aid in diagnosis may be useful to those whose interests are in this particular field.

The Effect, Dosage, and Uses of Atropine in Dogs with Reference to Treatment of Poisoning by Anticholinesterase Agents

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Atropine is a parasympatholytic drug which has been used in veterinary therapeutics for as long as it has been used in human medicine, and its present uses have just as wide a range of application for animals as for man. The pharmacology and veterinary therapeutic applications of the drug have been reported by Jones.[1]

The metabolism of atropine varies in different species,[2,3] but in both man and dog it disappears rapidly from the blood. Part of it is excreted in the urine unchanged and part is excreted as hydrolysis products. By some as yet unknown mechanism, the drug blocks transmission of the postganglionic cholinergic impulse to effector cells. In therapeutic doses, atropine has no important clinical action on the nervous system, and it does not affect blood pressure or heartbeat. Larger doses depress and weaken the myocardium, although respiration usually fails before the heart. It decreases secretions in the respiratory tract and dilates the bronchioles. It acts similarly on smooth muscles in the eye and dilates the pupils.

Atropine is used as an antispasmodic, to inhibit secretions, and to produce mydriasis and cycloplegia. The dose as recommended by Jones,[1] without reference to any particular domesticated animal, is given as 2 mg. (1/32 gr.)/100 lb. of body weight; to inhibit secretions in the dog, the dose varies from 0.3 mg. (1/200 gr.) to 0.6 mg. (1/100 gr.).

This paper has two main purposes: (1) to show that the normal dog can tolerate larger doses of atropine without impair-

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The authors are grateful to the office of the station veterinarian and the 35th Quartermaster Pack Company of Camp Carson, Colo., for making their personnel and animal facilities available for these studies; and to Dr. J. R. M. Innes, chief of the Pathology Branch, Chemical Corps Medical Laboratories, for assistance in the preparation of the manuscript.

ment of normal activity; and (2) to make known the value and dosage of this drug as a specific remedy for acute poisoning by all substances which have an anticholinesterase action. This latter is important due, in part, to the introduction of the so-called "nerve gases" as a chemical warfare agent,[4,5] and partly because some of the newer organic esters of phosphoric acid derivatives, such as parathion, hexaethyl tetraphosphate (HETP), tetraethyl, pyrophosphate (TEPP), and octamethyl pyrophosphoramide (OMPA), are related to the nerve gases and possess the same actions. These are being widely used in agriculture as insecticides. Cases of poisoning, some fatal, by these toxic chemicals have occurred in animals and man.

The toxic effects of anticholinesterase agents, which include organic phosphorus insecticides, appear to be due largely or wholly to the irreversible inactivation of the enzyme, cholinesterase, with the consequent accumulation of toxic amounts of acetylcholine at its normal sites of liberation throughout the body. These drugs produce miosis, ciliary spasms, and bronchoconstriction, with eventual anoxia, collapse, and paralysis of respiration.[4,5] Clonic and tonic convulsions are a prominent distressing terminal feature, as are massive salivation and incontinence of urine and feces.

This report is a brief, somewhat incomplete, picture but is sufficient to acquaint veterinarians with the nature of this type of poisoning and to emphasize that the best known treatment consists of: (1) immediate and rapid parenteral administration of atropine to control its effect on the muscular and central nervous systems; (2) artificial respiration; and (3) general supportive therapy.

The influence of atropine in varying amounts on dogs, with particular reference to effects on the abilities of scout and watch dogs performing intelligent working tasks, has been investigated and is briefly reported. Although all observations were made on German Shepherds, the results are believed to be equally applicable to other breeds.

OBSERVATIONS

In controlled experiments, some of the animals were given atropine sulfate and some placebo injections, and their effect on the ability of dogs to perform certain tests of scouting and police work was assessed by a panel of competent, unbiased observers who had no knowledge of the amount or type of injection. Independent ratings were made on the dogs' intelligence, willingness, energy, aggressiveness, and sensitivity. Physiological measurements of drug activity were made from changes in pupil size, pulse rate, temperature, and respiration rate before and after the test.

The results were summarized as follows: (1) Atropine dosage is associated with a reduction in the total efficiency of these dogs, as shown by reduction of willingness, aggressiveness, and energy. (2) Changes in pupil size are significantly related to changes in dosage in the range of 1 to 4 mg., the increased dilatation being about 1.5 mm. for each milligram increase of atropine. (3) The pulse rate increased about 13 beats per minute for each milligram increase of atropine, up to 4 mg. (4) No significant relationship was found between dosage and magnitude of the change in either temperature or respiration rates.

SUMMARY

The dose of atropine generally recommended for dogs is apparently far lower than can be safely given to obtain maximum pharmacological effect for any purpose. Except for toy breeds, 2 mg. of the drug can probably be recommended as a normal therapeutic dose and up to 6 mg. can be given without gross ill effects. In poisoning by anticholinesterase substances, which include modern organic phosphorous insecticides, a maximum of 2 mg. of atropine sulfate should be given as soon as possible and repeated if necessary.

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Unabsorbed Egg Yolk in Chicks

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THE PRESENCE of unabsorbed yolk in chickens of various ages has frequently been interpreted by some veterinarians and laymen to be an indication of faulty management or handling during the first few days of the chick's life and to be a handicap to later growth or development. Available experimental evidence,[1-3] however, does not substantiate these interpretations.

In 1929, Parker[1] conducted replicated experiments and concluded that the course of yolk absorption was unaltered by early handicaps and poisons. These handicaps included overheating to 135 F., chilling to 33 F., deprivation of water for six days, feeding of poisons (including nicotine sulfate and mercury), and deprivation of feed for five days. These treatments were applied so severely that some of the chicks died in all groups. Even these severe treatments, however, had no permanent effect upon gains in weight, or upon the absorption of yolk. It was found that the mortality which occurred during the first ten days was selective and that usually the chicks that died had been significantly smaller at 1 day of age.

Schilling and Bleecker[2] concluded from their experiment that, "there is no indication in this group of chicks that chicks making more rapid gains used up their yolk more rapidly or that slow absorption was accompanied by retarded gains."

Recent persistent reports that unabsorbed yolk is an indication of some previous hardship or causes trouble merely because of its presence in chicks over 2 weeks of age have indicated a need for a study of this subject.

The following experiments were conducted, therefore, to determine the association between unabsorbed yolk and body weight of chicks. It is believed that the relative weight of a chick reflects its health and that those below average weight in any group will include a majority of the chicks with low vitality or deleterious abnormalities.

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EXPERIMENTAL RESULTS

The chicks used in this study included 500 New Hampshire and 450 White Leghorn cockerels.

The New Hampshire chicks were placed in electric brooders on the second day after hatching. At the end of the first week of brooding, the chicks were counted and every tenth chick was necropsied. A similar procedure was followed at weekly intervals thereafter, so that a random sample of approximately 50 chicks was obtained each week for ten weeks. The chicks which were killed were individually weighed and any unabsorbed yolk that weighed 0.1 Gm. or more was recorded. Yolk material varying from a speck of color up to 0.1 Gm. was considered irrelevant for the purpose of this study.

Fifteen to 30 per cent of all the New Hampshire chicks in each of the age groups had unabsorbed yolk (broken line in graph 1). When the necropsy records for the chicks were divided into two groups within each age, those above average in weight and those below, the proportion with unabsorbed yolk in the two groups was similar. When these same chicks were divided according to weight within each age into three groups of equal numbers (bars at bottom of graph 1), the distribution of unabsorbed yolks appeared to be independent of chick size. In order to obtain more precise information, the coefficients of correlation between body weight and yolk weight were determined (table 1).

The correlation, -0.074, was too small for statistical significance or importance. It seems clear from these results that the size of the unabsorbed yolk was no indication of good or poor health, to the extent that health is indicated by body weight of the chick.

Furthermore, among chicks in each of the four groups of New Hampshires necropsied at 7 to 10 weeks of age, the correlation between yolk weights and body weights was slightly positive, indicating that the weight of unabsorbed yolk had no diagnostic value as evidence of previous

TABLE I—Coefficients of Correlation (r Values) Between Body Weight and Unabsorbed Yolk Weight in Male Chicks, Groups of Which Were Necropsied at Weekly Intervals Up to 72 Days of Age

Age (days)	No. of chicks	r value	
		New Hampshires	White Leghorns
7	51	....	+0.006
9	50	−0.243	....
14	50	....	+0.046
16	50	−0.012	....
21	50	....	−0.012
23	50	−0.000	....
28	50	....	−0.165*
30	50	+0.028	....
35	50	....	+0.113
37	50	−0.576†	....
42	42	....	+0.173
44	50	−0.087	....
51	50	+0.159	....
58	46	+0.002	....
65	44	+0.068	....
72	49	+0.011	....
Average		−0.074	+0.027

*Significant at 0.05 level. †Significant at 0.01 level. One exceptionally small chick in this group had a large unabsorbed yolk.

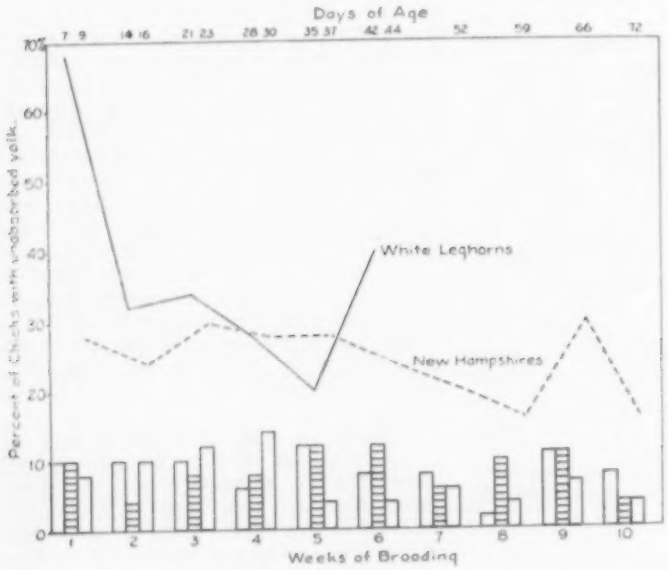
injury or mismanagement and of current state of health.

Three hundred of the White Leghorn cockerels were placed in brooders four hours after they were removed from the incubator and were later killed at weekly intervals in the manner described above. In these chicks, there was an insignificant correlation of +0.027 between the weight of the chick and the weight of the yolk (table 1).

The remainder of the White Leghorn cockerels, 150 chicks, were divided into six groups of 25 chicks each. Each group was held for a successively longer period of time, *i.e.*, twenty-four, thirty-two, forty-eight, fifty-six, seventy-two, and ninety-six hours, in the shipping boxes without feed or water. This was done to learn if withholding feed and water would cause the yolk to be absorbed more rapidly and reduce the proportion of chicks carrying unabsorbed yolk. All of these chicks were brooded under the same electric hover and were all killed at 2 weeks of age. The average body weight and the total percentage of the chicks which had unabsorbed yolk were compared with those chicks which were fed and watered within four hours and killed at 2 weeks of age. Graph 2 shows that the decrease in average body weight of the seven groups of chicks was linearly related to the length of time the chicks were held without feed and water.

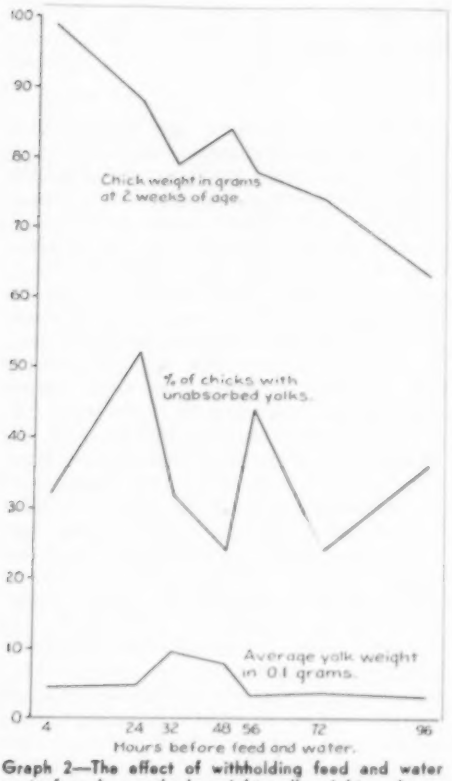
The percentage of chicks with unabsorbed yolk varied greatly among the groups, but absorption of yolk was not hastened by withholding feed and water (graph 2).

Since these data failed to provide any



Graph 1—Percentage of White Leghorn and New Hampshire chicks found to have unabsorbed yolk weighing 0.1 Gm. or more when killed at weekly intervals. Since the New Hampshire chicks were held in chick boxes for two days, each group was killed when two days older than the corresponding group of White Leghorns.

The bars indicate the percentage of New Hampshire chicks in the lower, middle, and upper weight classes, respectively, of each age group that had unabsorbed yolk weighing 0.1 Gm. or more.



Graph 2—The effect of withholding feed and water up to four days on body weight, yolk weight, and percentage of chicks with unabsorbed yolk, when killed at 2 weeks of age.

evidence that unabsorbed yolk is associated with poor health or slow growth, some apparently healthy adult males were necropsied to learn if yolk material is normally absorbed completely or may actually remain in small amounts until maturity. Males were used instead of females because the unabsorbed yolks were frequently not attached to the yolk stalk in chicks and, if they were found in laying hens, would normally be considered residue of ova produced by the hen herself. Twenty White Leghorn males, 1 year of age, were examined and unabsorbed yolk was found in 7 individuals. Forty-two males, 2 years of age, were examined and unabsorbed yolk, over 0.1 Gm., was found in 6 individuals.

These results show that unabsorbed yolks do persist for long periods without any apparent harmful effects.

SUMMARY

In these experiments, the occurrence of unabsorbed yolk was not associated with body weights of chicks at ages from 1 to 10 weeks and, in some instances, it persisted for more than two years in apparently healthy males. It is concluded, therefore, that unabsorbed yolk is not a handicap to the growth or development of the chick.

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Immunogenic Agent Against *Leptospira Pomona* in Cattle

An immunogenic agent was prepared by acid-heat extraction of a soluble antigen from cultures of *Leptospira pomona* grown in Stuart's medium. Two separate lots of the material in an adjuvant, composed of lanolin and mineral oil, were inoculated subcutaneously, each in a different group of dairy-type calves (10-12 wk. and 6-8 wk.). Challenged parenterally with a virulent calf-passed strain of *L. pomona*, all calves receiving either one or two doses of the agent at weekly intervals were resistant to infection, whereas control calves in both trials developed leptospiremia and leptospiruria, with pathological and clinical signs of illness. No prechallenge titers to the microscopic agglutination-lysis test were elicited in the calves inoculated with one lot of the material, whereas the second lot of material produced a slight titer response.

The agent prepared as described is apparently reproducible, inexpensive, and produces immunity to at least the homologous serotype of Leptospira. In the experimental trials it not only protected against clinical symptoms of leptospirosis but also prevented the urinary shedder state from developing.

Animal Vision

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IN RECENT veterinary literature, the articles on the eye have pertained to diseases and surgery in small domestic pet animals. This paper, however, deals with the mechanics of animal vision.

Some of the following information comes from rather ancient veterinary literature; some from comparative studies, a by-product of research on the human eye; and some from modern veterinary writers in many countries. Most of the older material was accumulated late in the nineteenth century or early in the twentieth. Two books dealing exclusively with veterinary ophthalmology were published—one by Nicholas in France, the other by Jacob in the Netherlands. Two journals of comparative ophthalmology appeared at about the same time, the *Zeitschrift fur Vergleichende Augenheilkunde* and the *Archiv fur Vergleichende Augenheilkunde*. They dealt exclusively with the animal eye but neither survived World War I. Only the work by Nicholas was translated. This period which was relatively rich in literature on veterinary ophthalmology, corresponded to the period during which the horse was of great importance as a military animal, and much of the work was on the horse's eye. With the advent of mechanization, the study of the horse's eye was no longer subsidized by the state and veterinary ophthalmology entered a period of virtual eclipse.

We are now undergoing a renaissance in this field, with the accent on the eye of the dog and to a lesser extent the cat. Much has been published by workers in the United States, the United Kingdom, Germany, Austria, France, the Netherlands and, to a lesser degree, in Italy and South America. Uberreiter in Vienna has a fine collection of specimens, clinical data, and experiences which will shortly be published; Parry in England is contributing to the study of degenerative retinal diseases in the dog; Veenendaal in Utrecht is making progress in collecting material of general academic and clinical interest; and many others are becoming interested in this field.

Optics is that part of the science of physics which deals with the transmission of light, the laws of refraction, reflection, and the phenomena of vision. Many have observed that the domestic animals have poor vision. The dog is myopic, astigmatic, and color-blind, and has little accommodation. Moreover, the highly curved cornea and lens bend the light rays too much and the image is formed in front of the retina, making it optically impossible for the dog to bring an image to sharp focus on the retina. By contrast, myopia and astigmatism are practically unknown in undomesticated species. The eye of the wolf is emmetropic, a condition in which the image comes to a focus on the retina, and he has no astigmatism. The color of the iris and the anteroposterior measurements are uniform, and one wolf eye is much the same as any other, there being very slight variations in refraction among individuals. The selection process which has produced dog breeds of greatly varying anatomical types has produced haphazard combinations of the various genetic factors that account for the optical system, the corneal size and shape, lens curvature, and anteroposterior measurements resulting in the poor visual apparatus of the dog breeds we know today. Similarly, in breeding for whiteness in the Persian cat and smallness in the toy Boston Terrier, disregarded genetic linkages have resulted in a tendency to deafness in these breeds. In producing the various dog breeds with accent on size, color, coat, ear carriage, and the like, the refractive errors that evolved at the same time have been overlooked. We often say that the dog does not need good vision because he depends on other senses, hearing and smell for instance. It would probably be more accurate to ascribe the excellence of these senses to a survival necessity. The dog has sharpened his other senses because his vision is so poor.

On the other hand, many breeds of cats have evolved but they do not vary greatly in anatomy. The skeleton of a Siamese cat looks much like that of any other breed of cat. Correspondingly, there is little variation in the optical refractive state among breeds and individuals. The cat has much better vision than the dog and has even retained three to four diopters of accommodation through his evolution. The superior vision of the cat is also in keeping with its hunting habits, which require better accommodation than the dog. It would be pertinent to determine the state of refrac-

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Presented at a meeting of the American Association for the Advancement of Science in Berkeley, Calif., Dec. 28, 1954.

tion of such breeds as the Dachshund, the Borzoi, and the Greyhound which use their eyes for hunting.

WHAT IS VISION?

In early Greek times, it was thought that light rays originated in the eye and that the lens received and emitted light. The fact that some of our domestic animals, and the carnivores in general, possess a tapetum with a brilliant light reflex no doubt supported this theory which persisted into the Middle Ages. It was disproved by the manufacture of the first camera lucida which was made by cutting out a small piece of the back of the eye, leaving the semitransparent retina intact. It was then possible to demonstrate that the retina acted as a photographic screen for images projected into the eye through the cornea.

We now know that vision is a series of distinct processes that may be used separately or cooperatively. The cornea and lens bend light rays entering the eye so that an image is formed in proximity to the retina. With a little adjustment of the curvature of the lens, a process we call accommodation, the image comes to a focus on the retina. This spot of sharp focus in man is called the fovea, but domestic animals do not have one; instead they have a larger, less sensitive area of retina on which the image is probably not as sharp.

The retina of the mammalian eye is composed of light-sensitive elements which, upon being stimulated, produce electrochemical responses. These impulses are transmitted to the brain where they are interpreted and this interpretation depends upon the experience of the observer. So a newborn baby looks but does not see; only after learning something of the nature of objects through other senses can he actually see or perceive them. It can be said that we look with our eyes but see with our brains.

The visual apparatus of domestic animals has much in common with that of man. However, there are wide variations among species and even among breeds. The pupil of the horse is compressed dorsoventrally, the dog's is round, the cat's oval or slitlike. The Collie's eye is small compared with that of the Pekingese. The globes are placed frontally in the flat-faced breeds like the Boston Terrier, while they are more laterally placed in the Shepherd. Hunters, like the cat and owl, have frontally placed eyes to find their prey, while the rabbit and mouse have eyes that are laterally placed, providing a wide visual field to observe danger from without. Grazing animals have such wide visual fields that they can almost see behind themselves. However, the blind spot in cattle is somewhat bigger than the head.

FACTORS IN ANIMAL SIGHT

Accommodation.—If a picture has just been taken of a landscape with a camera focused for distance and a portrait is desired, an adjustment is necessary. In the camera, this is done by moving the lens away from the film. In the eye, the ciliary muscle contracts, which tends to relax the suspensory ligament of the lens, allowing it to assume a more spherical shape. The rays of light will now be bent more by the lens and come to a focus on the retina. This process of focusing is called *accommodation.*"

Animals have a rudimentary type of accommodation. It has been determined by the shadow test, a completely objective method, that the dog is uniformly myopic, the eye being so constructed that the image comes to a focus in front of the retina. The degree varies between 1.5 and 6.0 diopters and averages 3.0 diopters. The myopia exists in puppies and does not change appreciably with age. While the ability to accommodate or focus is rudimentary in the dog, some investigators have been able to encourage as much as 1.5 diopters of accommodation by the daily use of eserine for a week. This drug stimulates the parasympathetic nerve, causing the ciliary muscle to contract. Such a degree of accommodation is slight compared with the 7.0 diopters accommodation of the normal 30-year-old man or the 10.0 to 12.0 diopters of hawks and other predatory birds that swoop down from great heights, with precise aim at rapidly moving prey.

The dog has poor accommodation, or ability to focus, because the lens is firm and the ciliary muscle is comparatively weak, while the hawk's eye has a soft lens and the ciliary muscle is powerful, permitting great changes in lens curvature.

With aging in man, the ciliary muscle loses its power and the lens undergoes sclerotic changes which make adjustments

in curvature impossible, a condition we call presbyopia, literally "old sight." A dog is naturally presbyopic, having little ability to focus at any age.

In evaluating the state of a dog's refraction, a cycloplegic such as atropine is not required because accommodation is practically nonexistent. But dilating the pupil with homatropine is useful because it gives a better view of the retina.

The refraction of the horse's eye has been investigated by workers in many countries. In a series of 600 horses refracted in Germany, hyermetropia (a condition where the image comes to a focus behind the retina) was found to be common. On the other hand, in Great Britain a majority of horses were myopic and a few were hypermetropic and emmetropic. If myopia is the rule, it does not seem to interfere seriously with the function of jumpers and hunters whose work requires a great deal of discrimination of height and distance. Accommodation is rudimentary in the horse, the ciliary muscle being slightly developed and the lens large and firm.

Sheep and pigs possess ciliary muscles but lack any amplitude of accommodation. These animals with little or no accommodation have an optical apparatus much like that of the fixed-focus camera in which few adjustments are possible.

With his myopia, astigmatism, and lack of accommodation, the dog compensates in part by having a large pupil (3 to 4 times that of man) and he possesses a large visual field. In addition, with the aid of the tapetum lucidum the dog can see better under subdued light than can man.

Visual Field.—The visual field is the area that can be seen without moving the eye. The monocular field is the area seen with one eye, while the total field is the sum of the monocular fields. The visual field depends on the size and position of the eyes, the shape of the cornea, and the size of the sensitive retina. It differs considerably among species and breeds as these factors are variable.

In general, the monocular visual fields of animals are greater than those in man. In the horse, it is 180 degrees; in the cat, 200 degrees; and in man it is 150 degrees. In addition to the monocular visual field, there is a field of vision common to both eyes, the field of binocular vision. In binocular vision, each eye regards an object at a slightly different angle but the brain registers the image as one, ascribing the difference to the position of the eyes. This adds to what we call depth perception. Some degree of binocularity is the rule in domestic animals. It is generally believed that the one-eyed animal is seriously handicapped. However, the one-eyed dog can learn to use its eye satisfactorily, and the one-eyed horse can perform all but the most exacting work, such as jumping and hunting.

The one-eyed animal uses its sense of perspective and parallactic displacement to compensate in part for the loss of binocular vision. The sense of perspective is a faculty that can belong to one eye alone. In any visual field, distant objects are relatively smaller than nearby objects, so some idea of the distance of an object is obtained if we can identify it.

Parallactic displacement can also be perceived by one eye alone. If we are on a rapidly moving train passing through a forest, the nearby trees stream past rapidly, while the distant ones appear to move slowly and in the opposite direction. The speed with which the front and rear trees separate is a measure of their distance from each other. This parallactic displacement is a phenomenon that animals as well as man can perceive. The two qualities, perspective and parallactic displacement, give the one-eyed animal a substitute for binocular depth perception.

Some animals have special adaptations for improving vision. The cat, for example, has the ability to "stop down" (a camera term), making the pupil slitlike and thus increasing the depth of focus.

Color Perception.—After many hundreds of experiments, it is still not certain what color means to animals. These experiments have mostly been conducted so that the animal begins to associate certain colors with food or with fear and so on. After the association is firmly fixed, the animal is tested with the various colors. In most experiments, it appears that the animal can distinguish between colors largely because of the brilliance factor, rather than through color discrimination.

Kalischer conducted a series of experiments with dogs which were fed under a red light and were exposed to an unpleasant experience under a blue light. He concluded

that dogs do perceive color differences but with strong individual variations.

It appears that: (1) Dogs may have a rudimentary type of color discrimination; (2) their color sense is weak; (3) color discrimination is confused or weakened by changing the position or shape of the color.

It is probable that dogs can distinguish between different shades of gray better than they can between different primary colors. Apparently, color discrimination as such does not mean much to dogs in their daily activities. The cat is color-blind in this same sense.

Tapetum Lucidum.—The tapetum lucidum was known to the ancient Egyptians who observed it in the cat. It is likely that the sacred position of this animal in their civilization was due in part to the tapetum and its brilliance in reflected light.

The brilliant eyeshine from cats and dogs when approached on the highway at night is caused by the tapetum lucidum, which intensifies the light entering the eye and permits a degree of nocturnal vision not available to the nontapetal animal. Under conditions where the human retina receives insufficient light to register an impulse, the animal retina receives direct rays and is also stimulated by rays reflected back from the tapetum. The tapetal layer is behind the retinal rods and cones. The tapetum consists microscopically of ten to 15 regular layers of cells, which contain a highly refractile material, the nature of which has not been determined. In the ophthalmoscopic picture of the dog fundus, the brown or black retinal pigment is confined to the inferior quadrant, the tapetum lucidum occupying the superior part which is yellow, greenish, or sometimes blue.

Anatomically, the tapetum lucidum of the dog is variable in color, usually yellow in the center and becoming green at the periphery. In the tapetum lucidum area, retinal pigment cells are few or absent so that there is an area of high reflective brilliance. The principle of the familiar yellow filter which we use in photography to increase contrast is used also in the tapetum lucidum where the yellow coloration serves a similar purpose. Thus, not only are the retinal elements subjected to a double stimulation from direct and reflected rays, but objects stand out more distinctly because of the yellow coloration of the tapetum.

Histologically, the tapetum lucidum consists of highly refractile rods and threads. It may be associated with the color of the coat so that in the harlequin Great Dane it is gray, while in the chocolate Pomeranian it is chocolate in color.

The tapetum nigrum is a roughly triangular area in the inferior quadrant with one point of the triangle approaching or encircling the optic disc. Its color arises from the retinal pigment alone or the chorioidal color shining through the retinal pigment. Superiorly it is rarified, allowing portions of the tapetum lucidum to shine through.

Perhaps I should apologize for using so many unfamiliar terms; however, they are essential in developing our understanding of vision in general and animal vision in particular. The study of the animal eye is only beginning.

SUMMARY

Domestic animals are generally shortsighted, have unequally curved corneas, are color-blind, and have little ability to focus. They do have good night vision, can see a large area at one time, possess a sense of perspective, and have special qualities. Among such are the cat's narrow pupil, the horse's horizontally elongated pupil, and the dog's large pupillary opening.

Human Dermatoses and Industrial Oils.—Dermatoses caused by exposure to cutting oils used in industry constitute 10 to 15 per cent of all eruptions seen by dermatologists. These oils are usually insoluble and of the paraffinic or naphthenic types. Some are mineral oils with sulfochlorinated fat or other chlorinated additives. However, not all of the oils involved are chlorinated. —*J.Am.M.A., April 30, 1955.*

Therapy for Brucellosis in Man

When brucellosis in man has been established by isolation of the organism from the tissues or body fluids, a combination of 0.5 Gm. of either dihydrostreptomycin or streptomycin, intramuscularly, every 12 hours for two weeks, with 0.5 Gm. of tetracycline, orally, four times daily for three weeks, has proved effective. Some advocate the addition of 1 Gm. of sulfadiazine four times daily for three weeks. If a relapse occurs, a second course of these drugs may

be given. In severe, acute brucellosis, ACTH or adrenocorticosteroids may be used but only for 48 to 72 hours and always with the above therapy.—*Antibiotic Med., May, 1955.*

Studies with Anti-Rabies Serum

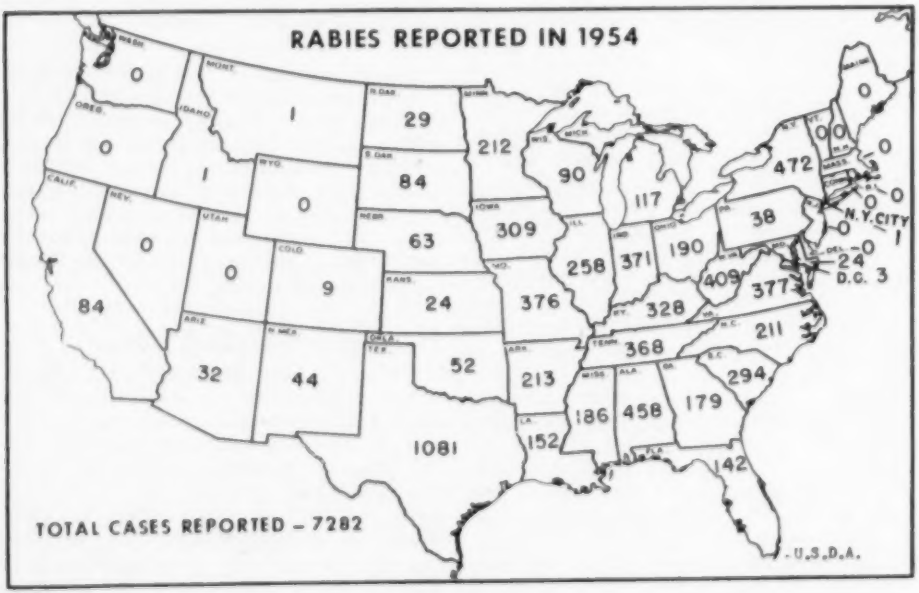
Anti-rabies serum prepared in horses was more potent than that from sheep. When tested on 252 rabbits, 155 sheep, and 72 horses, the serum was effective only when administered before the intracerebral dose of challenge virus was given. The serum prevented clinical disease in 45 per cent of the animals when given three to four days before the virus; in 36 per cent when given two days before the virus; and in 33 per cent when given one day before challenge. When given simultaneously, the serum was only 12 per cent effective.—*Vet. Bull., April, 1955.*

Treatment of Bites by Rabid Animals

Guinea pigs were inoculated intramuscularly with a strain of fixed rabies virus in a manner which simulated bite wounds. After varied intervals, the wounds were treated with different virucidal substances. Irrigation with a 20 per cent soap solution was as effective in preventing rabies as cauterization with fuming nitric acid. Zephiran, a cationic detergent, was the most effective.—*Vet. Bull., March, 1955.*

Rabies in the United States in 1954

During 1954, 7,282 cases of rabies were reported—4,083 in dogs, 462 in cats, 930 in cattle, 29 in horses, 23 in sheep, 40 in swine, and 10 in goats. The 1,672 miscellaneous cases reported occurred in 1,028 foxes, 547 skunks, 48 racoons, 8 squirrels, 5 coyotes, 5 muskrats, 4 bobcats, 2 wolves, 2 bats, and 43 other wild animals. There were 8 cases in man. Virginia, New York, Alabama, and Texas each had over 100 cases in foxes. Iowa and Minnesota each had over 100 cases in skunks. Florida had 16 racoon cases. The 2 rabid bats were found in Texas which led all states with a total of 1,081 cases, 799 of which were in dogs. New York had 250 cases in cattle, Missouri 78, Tennessee 75, Minnesota 76, and Iowa 59 (*see* map below).



The Clinical Laboratory Diagnosis of Salmon Poisoning

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SALMON POISONING, a misnomer, is an acute canine rickettsial disease of high mortality, which is indigenous to the Pacific Coast from northwestern California to southwestern Washington. The purpose of this paper is to review the methods commonly employed to diagnose this malady and to introduce a diagnostic technique which has been found valuable in this laboratory.

The etiological agent of salmon poisoning, *Neorickettsia helminthéca*,[1] utilizes a fluke, *Troglotrema salmincola*, as a transmission mechanism. This fluke has a three-host (dogs and certain other carnivores, snails, fish) life cycle. Members of the family Canidae contract the disease after ingestion of raw fish of the Salmonidae family containing the infected metacercariae of *T. salmincola*.[2] Forty dogs experimentally fed encysted trout, *Salmo clarkii*, form the basis of the observations given in this paper.

Salient features of a dog experimentally fed infected trout are recorded in chart 1. The disease has an incubation period of five to seven days, the onset being marked by a sudden temperature rise above 103. 5 F. which continues for a day or two. After the temperature reaches a peak (104 to 107 F.), it declines at a nearly constant rate. By the third to sixth day after the beginning of signs, the temperature has usually returned to normal or below. The somatic lymph nodes become moderately to greatly enlarged shortly after the febrile response. The mesenteric lymph nodes can often be detected by careful palpation and are markedly enlarged in the later stages of the malady. Anorexia is an early sign and persists throughout the course of the disease. The dog becomes depressed, dehydrated, and loses weight. Extreme thirst is evident and emesis is frequent. Severe diarrhea usually commences at the time of the temperature drop. The stool becomes extremely fluid and often contains blood. A conjunctival exudate may also be present at the inner canthus. Death usually ensues ten to 15 days after the ingestion of the encysted fish.

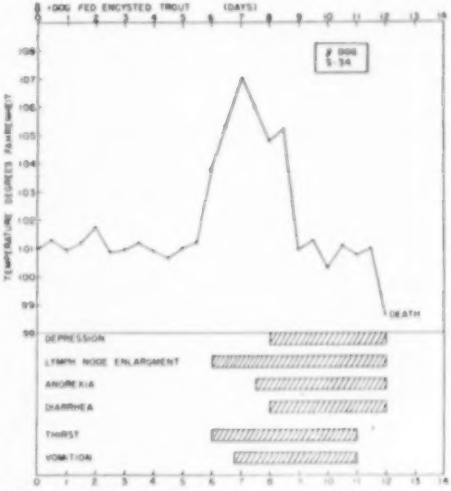

Chart 1—Clinical findings in a dog infected with Neorickettsia helminthéca.

CLINICAL DIAGNOSIS

Fluke Egg Examination.—Dennis, Stone, and Swanson[3] described a method for the diagnosis of liver fluke infection that is applicable for the recovery of the ova of *T. salmincola* in the feces. The following is a brief review of their method:

It consists of a washing-sedimentation technique, using a mixture of 5 cc. of a household liquid detergent and 995 cc. of tap water to which a few drops of 1 per cent alum (aluminum potassium sulfate, U.S.P.) have been added. This fluid becomes somewhat gelatinous on standing; therefore, it is prepared at frequent intervals. A 1- to 3-Gm. fecal sample is thoroughly mixed with about 15 cc. of the detergent solution in a large test tube or other container and the mixture is strained into

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Scientific paper No. 1380, Washington Agricultural Experiment Station, Pullman. This investigation was supported in part by funds provided for biological and medical research by the State of Washington, initiative measure No. 171.

The authors express their appreciation to G. C. Webb, Alsea Trout Hatchery, Philomath, Ore., for supplying infected trout used in this investigation.

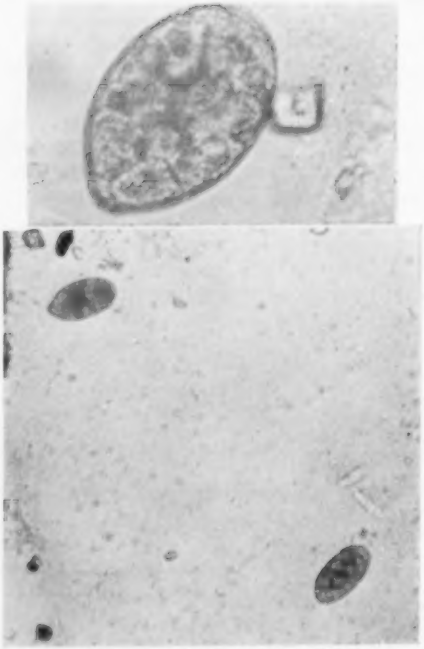


Fig. 1—The ova of Troglotrema salmincola. Top, x 350; bottom, x 100.

a 50-cc. centrifuge tube. The material on the strainer is washed with more detergent solution until the centrifuge tube is filled to the 50-cc. mark. The suspension is allowed to stand for five to ten minutes and then the supernatant fluid is carefully decanted or siphoned off, allowing 2 or 3 cc. of the liquid and debris to remain in the centrifuge tube. The sediment is again washed by refilling the centrifuge tube to the 50-cc. mark with the detergent solution and allowing it to stand for another five to ten minutes. The supernatant fluid is then separated as before. (The ova will settle quickly in water, but the detergent solution floats off more debris.) A small amount of the sediment is transferred to a slide and examined for fluke ova.

Bennington[4] described the ova as ovoid in shape, 87 to 97 by 38 to 55 μ, light brown, operculate at one end and with a small blunt projection on the other. The operculum, however, is rather indistinct (fig. 1).

The demonstration of the fluke eggs in feces has been found a valuable adjunct to history and signs in the diagnosis of salmon poisoning. However, the following points must be considered: (*a*) recovered dogs may become infected with the fluke; (*b*) there are ova of other flukes of Canidae that may be confused with *T. salmincola*, without careful identification; (*c*) the ova may be overlooked in the early stages of the disease as fluke maturity and onset of signs occur about the same time. Later, in the course of a severe infection, a direct smear made from the feces adhering to a thermometer will contain fluke ova.

Skin Test.—Cordy and Gorham[5] inoculated Frei antigen* intradermally into 4 recovered dogs with no observable reaction. In the present study, a heat-inactivated antigen prepared from a lymph node of an infected dog was administered intradermally into 3 immune and 3 susceptible dogs. No skin reaction was observed. At this writing, other attempts to demonstrate skin sensitivity to inactivated lymph node suspensions have been discouraging.

Lymph Node Aspiration and Smear.—Demonstration of the rickettsial bodies in material aspirated from a lymph node has been used successfully at this station for the diagnosis of salmon poisoning in 12 dogs. The diagnosis was confirmed in all the cases by postmortem examination. Hadlow[6] also reported the demonstration of intracytoplasmic bodies by a similar method of lymph node aspiration.

Our collection procedure consisted of palpating the mandibular lymph nodes, medial

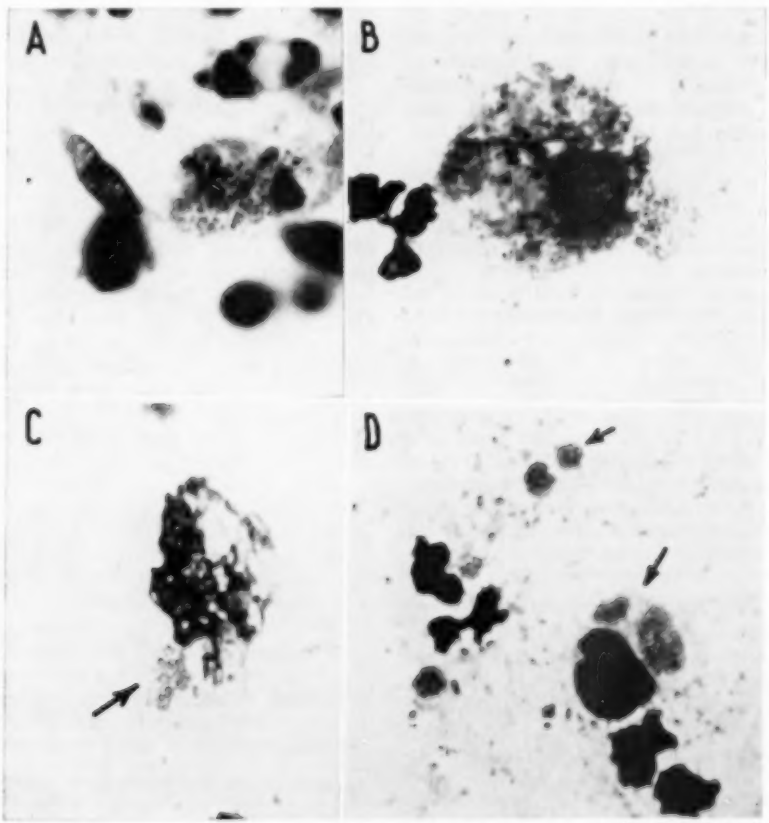
*Frei Antigen is produced by Lederle Laboratories, Pearl River, N. Y.

Fig. 2—Aspiration technique for obtaining a smear from the mandibular lymph node of a dog.

and ventral to the mandible, pulling one of them ventrally and clamping a curved intestinal clamp behind it (fig. 2). This pulled the skin tight and fixed the lymph node in position. A 20-gauge needle attached to a syringe was then inserted through the skin and into the node. A distinct resistance was felt as the needle penetrated the node capsule. By withdrawing the plunger of the syringe and compressing the lymph node, a few drops of milky fluid could be aspirated into the needle. The fluid aspirated was not seen in the syringe but usually remained in the needle. By a pumping action on the syringe, the fluid was blown from the needle onto a clean, dry slide. The drop was smeared, allowed to air dry, fixed, and defatted for one minute, using a mixture of equal parts of ether and alcohol, and stained by Giemsa's or Macchiavello's technique.

The rapid Giemsa technique used for the smears consisting of staining the fixed, defatted smear with a 1:1 dilution of stock Giemsa and buffered water (pH 7.2) for two minutes. The slides were then washed and examined. This rapid technique occasionally lacked clarity, yet in the majority of cases the rickettsial bodies stained readily. The regular Giemsa stain was used if there was any doubt as to the presence of rickettsial bodies after staining with the rapid method.

On examination of the smear from infected dogs, intracytoplasmic bodies were seen in the macrophages (fig. 3). Cordy and



—*W. G. C. Beatcroft*

Fig. 3—Neorickettsia helminthéca stained by the Giemsa method in lymph node aspirations. Coccobacillary bodies (A, B) diffusely scattered in the cytoplasm of reticular cells; bacillary bodies (C) in a disintegrating macrophage; Morula-like clusters (D) free and in a macrophage. x 800.

Gorham[7] described these bodies as coccoid or coccobacillary, and of about 300 mμ in size. They stained purple with Giemsa's stain and were often seen free of the cells and could be mistaken for debris. Therefore, it is advisable to look for definite bodies in the cell cytoplasm. They were usually diffusely arranged in the cytoplasm but were occasionally seen in clusters.

Buffy Coat Smears.—Intracytoplasmic rickettsial bodies were also demonstrated in Giemsa-stained buffy coat smears from sedimented blood. This technique required additional time and effort. Furthermore, the rickettsial bodies were seen less frequently than when the lymph node-aspiration technique was employed.

SUMMARY

The routine methods for the clinical diagnosis of salmon poisoning have been reviewed. A method for the diagnosis of salmon poisoning by microscopic examination of stained material aspirated from lymph nodes has been presented.

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Thyroiditis from Potassium Iodide

In acute iodism, symptoms directly connected with the thyroid gland are unusual. However, 4 cases are reported in adults who were given 7.5 gr. of potassium iodide three times daily. After two to six doses to three persons, and about 40 doses to the fourth, acute tension with extreme sensitiveness developed in the thyroid gland which stood out in relief under the neck skin. All symptoms subsided in three days after the iodide was discontinued.—*Brit. Med. J., Feb. 5, 1955.*

Anaplasmosis in Sheep in the United States

EARL J. SPLITTER, D.V.M., M.S.; MARVIN J. TWIEHAUS, D.V.M., M.S.; EDIN R. CASTRO, D.V.M.

Manhattan, Kansas

While investigating an obscure, debilitating condition in a flock of sheep in western Kansas, citrated blood was obtained from a number of affected animals and returned to the laboratory for inoculation into 2 yearling lambs. During subsequent routine blood examinations of the lambs, marginal bodies identical in appearance with *Anaplasma marginale*, together with extracellular forms characteristic of *Eperythrozoon ovis*, were found in a few of the erythrocytes. Serums from these 2 lambs gave complete fixation of complement when combined with *A. marginale* antigen.

The microscopic occurrence of an Anaplasma-like body in sheep created particular interest for, at present, *A. marginale* is known to exist naturally only in cattle and deer in this country. A review of the literature indicates that this organism may be retained in a latent form in the blood of sheep for short periods following experimental infection, but apparently never has been recovered from naturally infected sheep nor has it ever been demonstrated microscopically in the peripheral blood of inoculated sheep. *Anaplasma ovis* occurs in naturally infected sheep and develops active, microscopic infection;[1] however, this organism has not been known to exist in the United States or, apparently, in any country of the Western Hemisphere.

Experimental studies were initiated to determine the nature of the Anaplasma-like bodies, and their relation to bovine or ovine anaplasmosis. Transmission to other sheep was accomplished by intravenous injection of citrated blood in 5-cc. quantities. Anaplasma bodies varying in diameter from less than 0.4 μ up to 0.8 μ appeared in the peripheral blood in eight to fourteen days in 6 inoculated sheep. A gradual increase in frequency occurred until their maximum

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numbers were reached, after which a gradual decline took place. A maximum infection of 1.5 per cent of the erythrocytes occurred in these nonsplenectomized animals. Erythrocyte counts decreased 2 to 7 million cells per cubic millimeter from the preinfection values, but a simultaneous infection of *E. ovis* was present in all cases, making it impossible to determine the organism responsible for the reduction of blood values. *Eperythrozoon ovis* is known to be capable of producing variable degrees of anemia in experimentally inoculated sheep.[2] Temperatures remained normal or slightly elevated. Visible clinical symptoms did not develop. Positive reactions to the anaplasmosis complement-fixation test (*A. marginale* antigen) occurred in all sheep inoculated, beginning at about the time of the microscopic appearance of Anaplasma.

A splenectomized lamb was injected with Anaplasma previously passed through 2 nonsplectomized sheep. Microscopic infection was evident in thirteen days. *Eperythrozoon ovis* infection had also developed at this time but was eliminated microscopically with neoarsphenamine. The resulting course of anaplasmosis that occurred was identical with that of bovine anaplasmosis[3] with the number of Anaplasma organisms approximately doubling each day until a maximum erythrocytic infection of 19 per cent was reached. This peak of infection occurred twenty-six days after experimental inoculation. A gradual reduction of Anaplasma followed, together with the development of a progressive anemia. Erythrocytes reached a low of 3 million cells per cubic millimeter.

Further evidence that the inclusions observed were Anaplasma was obtained by using the technique of Lotze and Yiengst.[4] Blood smears prepared from heavily infected blood, which had been treated with 0.5 per cent acetic acid in physiological saline solution, showed that the large Anaplasma could be broken down into eight smaller bodies. Anaplasma of a smaller diameter remained intact.

Studies are continuing to determine the species of Anaplasma involved. It seems probable now that the organism is *A. ovis*. Splenectomized calves have remained normal for more than sixty days following inoculation of infective sheep blood without developing evidence of *A. marginale* infection. Cattle have been shown to be insusceptible to *A. ovis*.[1]

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Toluene Therapy for Ascariasis and Bot Infestations in Horses

HAROLD M. S. SMITH, V.M.D.

Hanover, New Jersey

Each year, in equine practice, the problem of ascarid control in young horses arises. My routine in the past has been to worm the suckling colts at 8, 12, and 16 weeks of age with carbon disulfide, given by stomach tube after fasting the animals for at least 18 hours. This treatment was repeated at weaning time and periodically thereafter. The carbon disulfide therapy frequently was followed by a slight gastritis and evidence of colic. Another disadvantage was the farm labor required to strip the stalls down the clay for the fasting period and rebedding the animals after medication. When a large number of horses were to be wormed at one time on a farm, this factor became important.

An article by Todd and Brown of Kentucky in 1952[1] and subsequent correspondence with these men stimulated the use of toluene (methyl benzene) as a substitute for carbon disulfide.

Todd and Brown found that toluene, 0.2 cc. per pound of body weight, given without fasting the animals, proved 99.8 per cent effective in 24 hours, the worms recovered at necropsy at that time being greatly decomposed. Furthermore, the toluene had

Dr. Smith is a general practitioner in Hanover, N. J.

[1]Todd, A. C. and Brown, R. G. Jr.: Critical Tests with Toluene for Ascarids and Bots in Horses. Am. J. Vet. Res., 47, (1952): 198-200.

been well tolerated despite its irritant nature.

For bot treatment, they found that toluene was more rapidly effective than carbon disulfide. In 22 horses, toluene killed 80.69 per cent of *Gastrophilus intestinalis* and 23.76 per cent of *Gastrophilus nasalis* in 24 hours. Some of these animals showed a brief period of depression following the toluene treatment. In contrast, in 24 hours, carbon disulfide killed only 3 of 260 *G. intestinalis* and none of the *G. nasalis* present. However, after 48 hours a second group of horses treated with carbon disulfide showed the death of 90.42 per cent of the *G. intestinalis* and 93.24 per cent of the *G. nasalis*.

This review points out the superiority of toluene in the treatment of ascarids. Since ascarids are a greater problem in young than in older horses, and since infestation occurs principally from the contaminated soil, a definite program of worm control in the young horse will gradually lead to complete eradication of ascarids on the individual farm. The recommended procedure is to give toluene to colts at 12 weeks and at 6 months of age, followed by its periodic use in yearlings, since only the adult worms present in the alimentary tract can be affected.

I have endeavored to control bot infestation partially by the daily removal of Gastrophilus eggs from the hair of pastured animals. Since this method of attack against bots has been augmented by the periodic worming with toluene, no problem with bots has arisen. Bots are seldom a problem in suckling and weanling colts until they are turned out to summer pasture; therefore, early treatment for ascarids with toluene is sufficient.

I have used toluene in doses of 0.2 cc. per pound of body weight on a total of 454 animals. Of these, 60 per cent were young horses (sucklings, weanlings, and yearlings), many of which received toluene on more than one occasion. The first treatment is generally given at about 12 weeks of age, the second at about 6 months of age when the animal is weaned. Subsequent treatments are given routinely 30 days after the first frost, at which time all mature and young horses are treated for bots.

Treatment consists of passing a stomach tube and administrating 0.2 cc. of toluene per pound of body weight, followed by sufficient water to clear the tube. Treatment can be carried out at any time of day without disturbing the feeding schedule of the animals. Most horses will resume eating immediately following the administration of the drug.

In only 1 of the 454 horses was there any evidence of a toxic reaction from toluene. About 30 minutes following administration of the drug, a weanling filly appeared incoordinated, staggering in a drunken manner, but showed no evidence of colicky pains. Within two hours, these symptoms disappeared. In one case, an attempt was made to produce a toxic effect in a 950-lb., pregnant brood mare. While on full feed, she was given 18 oz. of toluene (0.57 cc./lb.) by stomach tube — almost three times the recommended therapeutic dose. She developed colicky symptoms for about 15 minutes, then started eating hay. She showed no incoordination and three months later had a normal foal.

The overdosing of 1 mare does not give conclusive evidence of the nontoxic nature of toluene, but its administration to 454 horses without accident or ill-effect speaks for itself.

CONCLUSIONS

In my opinion, toluene is the ascaricide of choice for young horses. Although its action against bots is substantial, especially for *Gastrophilus intestinalis*, it is not the treatment of choice. The routine treatment of all horses for bots, following the first frost, with carbon disulfide should be continued until a better method can be developed.

Canine Dioctophymiasis in North America

With reference to the article "Incidence of Canine Dioctophymiasis (Giant Kidney Worm Infection) with a Summary of Cases in North America" (*J.A.V.M.A.*, May, 1955: 415-417), we have received a reprint on 2 additional cases:

Olson, C.: Two Cases of Infestation of the Dog with *Dioctophyme Renale*. J.A.V.M.A., *34*, (Aug., 1932): 252-255.

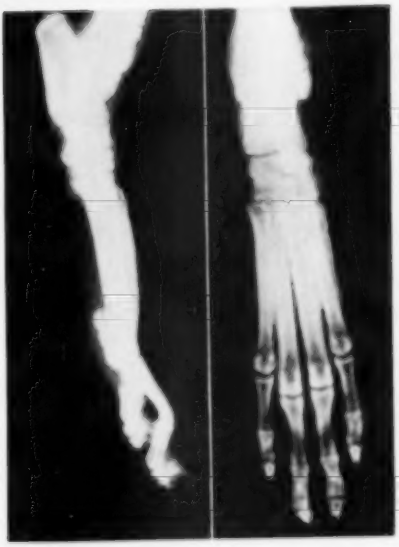
Since this reference has unfortunately been overlooked in the three major summaries (1934, 1950, 1955) on cases of canine dioctophymiasis, it will probably be overlooked in the future, unless placed in the literature.—*Frank A. Ebrenford, Ph.D.*

The Polar bear, a good swimmer, has been seen over 200 miles from land in the open sea.—*Sci. News Letter, May 28, 1955.*

What Is Your Diagnosis?

Make your diagnosis from the pictures below — then turn the page ▶

History.—A 5-year-old mongrel dog that was unsuccessfully treated for pneumonia over a three-month period developed thickening of the extremities and intermittent joint enlargement. Examination revealed crackling respiratory sounds, moderate dyspnea, as well as the diffuse firm enlargement of all four legs. Radiographs were taken.



(Diagnosis and findings are reported on next page)

Here Is the Diagnosis

(Continued from preceding page)

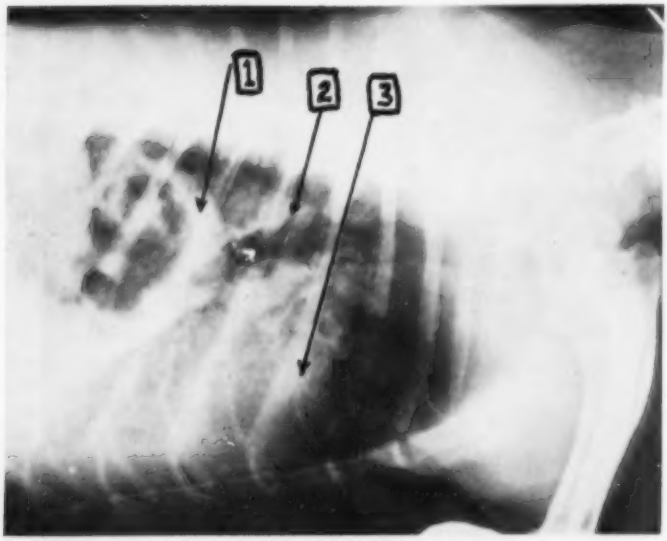
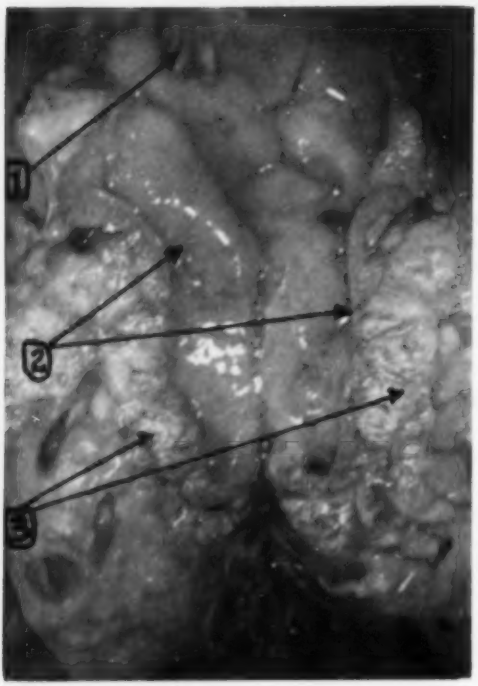


Fig. 1—The radiograph of the chest shows a large cavitation in the right diaphragmatic lobe of the lung with a distinct wall (1). A diffuse nodulation of the middle and posterior lung fields suggestive of bronchopneumonia is easily seen (2 and 3). (The dorsoventrad radiograph and fluoroscopy determined the side on which the cavitation was located.)



Diagnosis. — Pulmonary tuberculosis with secondary hypertrophic osteoarthropathy.

Comment. — Necropsy revealed a diffuse granulomatous pleuritis, pericarditis, and bronchopneumonia, with large caseated mediastinal lymph nodes. The large cavitation in the diaphragmatic lobe (fig. 1 [1]) connected with the bronchus (2) and contained a yellow caseopurulent exudate. Notice the widespread caseous necrosis shown in figure 2. Proliferative periostitis was evident on all the bones below the elbow and stifle joints.

The tubercle bacillus found in man was isolated from the purulent exudate in the lungs. Anamnesis revealed that the dog lived with a person who had active tuberculosis.

This case was submitted by Drs. Frank G. Fielder and Robert S. Brodey, School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

Fig. 2—Photograph of thoracic organs at necropsy. (1) Yellow caseous purulent exudate, (2) lung (diaghragmatic lobes), and (3) widespread caseous necrosis.

X-Radiation of Perianal Adenomas in Dogs

ROBERT B. McCLELLAND, D.V.M.

Buffalo, New York

Hyperplasia of nonfunctional sebaceous-type perianal glands (fig. 1) is common in aged male dogs.[1] The phenomenon is considered neoplastic, and the presence of mitosis and squamous metaplasia (fig. 2) in some animals leads to suspicion of malignancy.[2] However, extension or metastasis rarely occur. Even massive tumors fail to bother the host except for rare cases of mechanical interference to rectal function. Necrosis, ulceration, and hemorrhage are esthetic problems.

A total of 48 dogs, treated with x-ray therapy alone and in combination with surgery, were observed from August, 1949, to October, 1954. The dogs (45 males, 2 females, and 1 spayed female) were 6 to 16 (ave. 11.8) years of age.

The tumors, 0.5 to 10.0 cm. in diameter, were both single and multiple. To our knowledge, none had metastasized.

Physical and Treatment Factors.—Half-value layers of 0.38 mm. Cu to 0.45 mm. Cu were employed: the kilovolt peak (kv. p.) was 120 to 140, milliamperage 4 to 5, focal skin distance 20.0 cm. All doses were measured on the skin with backscatter.

Fractional doses of 300 r were administered at an average interval of 6.6 days.

Results.—Complete retrogression of the tumor mass following one series of treatments was evident in 23 of the 48 dogs studied. Of these, 11 required less than 1,000 r, 9 required 1,000 to 2,000 r, and 3 received 2,000 to 4,000 r. Six dogs died or were destroyed before planned treatment was finished.

Four of the 6 cases treated with combined surgery and x-radiation were successfully concluded.

Recurrence of the tumor was noted in 13 dogs, probably due to insufficient radiation. Eight of these were carried to successful conclusion. None recurred following total doses of 4,000 r.

Discussion.—Emmerson[3] successfully

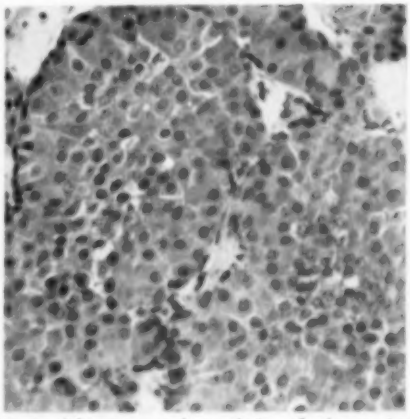


Fig. 1—Adenomatous hyperplasia of the perianal gland of a dog.

treated a dog, which had a perianal merocrine adenocarcinoma, with a total of 2,244 r (374 r x 6, at 4-day intervals). Thom[4] noticed an 80 per cent recovery rate when he used 140 kv.p, 0.25 mm. Cu filter, with total dosage of 1,400 r (280 r x 5, 7-day intervals). He recommended avoiding large doses of deep radiation which might damage the rectum.

The age and sex incidence of perianal adenomas in dogs points toward an en-

Fig. 2—Squamous metaplasia, perianal adenoma in a dog.

Dr. McClelland is a small animal practitioner in Buffalo, N. Y.

This paper was presented before the Seventy-First Annual Meeting of the Veterinary Medical Association of New Jersey, Feb. 3, 1955.

docrinological etiology. The host often tends toward obesity. Coexistent seborrhea, hyperkeratosis, and pigmentation of the skin is common.

Functional hypoadrenalism and chronic interstitial nephritis are also common in the aged male. Therefore, the insult of restraint and the contraindication of barbiturate anesthesia affect the interval between the fractional doses of x rays.

Daily fractional doses are most effective, but longer intervals are often advisable from the animal's physical standpoint. Careful physical examination and clinical-pathological studies should precede radiation therapy.

The size of the neoplasm and the degree of metaplasia enter into the plan of action. Small, irregular, firm masses of hyperplastic tissue usually require more radiation than large, soft perianal tumors. Actually, the degree of response during the course of treatment influences the operator's judgment more than any other factor.

Summary.—In 42 dogs with perianal adenoma, which were treated with radiation only, complete retrogression was effected in 31. Twenty responded to total doses of 2,000 r or less. Because of recurrence in 13, the optimum average total dose appeared to be 3,000 r (10 x 300) when the stated physical factors were employed.

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[7]Thom, Myron: The Future of Therapeutic Radiology in Canine Medicine. Proc. Am. Anim. Hosp. A. (1949): 190.

Ovine and Bovine Haemonchus Species

Studies of *Haemonchus contortus* from sheep and cattle indicated that they could be differentiated by the sexual characteristics of the parasites. Retention of the name *H. contortus* for the species in sheep, and adoption of the name *H. placei* (Place 1895) for the species in cattle, was proposed.—*Vet. Bull., April, 1955.*

Canine Histoplasmosis in the Pacific Northwest

CLIFFORD H. EBY, D.V.M.; LEIF M. RINGEN, Ph.D.
Pullman, Washington

There are a number of reported cases of canine histoplasmosis, the majority of them originating in the East Central part of the United States.[1] Apparently, this is the first reported case in a dog native to the Pacific Northwest. The animal, a 3-year-old male Cocker Spaniel, had its lifetime habitat in this area, with no trips to other parts of the United States.

The dog had received no immunization of any type. For the week prior to submission, it had exhibited a bloody, mucous feces of watery consistency, and for a year it had had a soft, unformed daily evacuation.

It had shown paraplegic signs in the rear quarters for the past several days. It was a well-nourished dog, and the temperature and a hemogram were normal. A fecal examination was negative for parasites. An intradermal histoplasmin* test was also negative.

Treatment was symptomatic using intestinal protectives, multiple vitamins, and prostigmine.[2] The patient walked and appeared bright and alert within 24 hours after treatment. Although various types of medications and diets were used, the diarrhea persisted but the feces did not appear bloody. Since histoplasmosis was suspected, euthanasia was performed.

Necropsy revealed a catarrhal enteritis and congestion of the colon. The lymph nodes in the abdomen were enlarged, pale, and firm, and one had caseous foci. The small intestine was slightly thickened and its contents were gray, sticky, and tenacious. Microscopic examination revealed numerous macrophages and a few neutrophils in the pancreatic and colic lymph nodes and surrounding adipose tissue. The lamina propria of the jejunum and ileum was markedly infiltrated with macrophages. There was fibrosis of the submucosa of the

From the Department of Clinical Medicine and Surgery (Eby), and the Department of Veterinary Microbiology (Ringen), College of Veterinary Medicine, State College of Washington, Pullman.

[1]Cole, C. R., Farrell, R. L., Chamberlain, D. M., Prior, J. A., and Saslow, S.: Histoplasmosis in Animals. J.A.V.M.A., 122, (1953): 471-473.

*Obtained from Ohio State University, College of Veterinary Medicine, Columbus, Ohio.

ileum which contained many small granulomatous foci of macrophages and neutrophils. Scattered macrophages in the lymph nodes and intestine contained small intracellular structures resembling *Histoplasma capsulatum* (fig. 1).

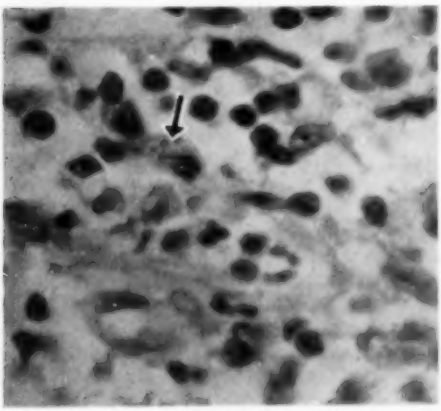

Fig. 1—Lymph node showing intracellular structures (arrow). x 900.

A portion of the cecocolic lymph node was macerated in saline and 0.5 ml. of this suspension was inoculated intraperitoneally into a white mouse. The mouse was killed 28 days later. Smears and cultures were made from the liver, spleen, and sternum. The smears were stained by Wright's method, while the cultures were made on horse blood agar incubated at 37 C. and Sabouraud's glucose agar incubated at room temperature.

Fig. 2—Culture showing tuberculated spores of Histoplasma capsulatum. x 900.

Microscopic examination of the liver showed intracellular bodies similar to those observed in the tissues from the dog.

After four to five days of incubation at 37 C., small, flat, dry, fungous colonies appeared on all of the agar plates. As the colonies became older, the typical tuberculated spores of *H. capsulatum* were observed (fig. 2). Upon primary isolation, this organism failed to grow at room temperature or to form the yeast phase of growth. However, a few yeast cells were observed after several transfers on blood agar incubated at 37 C.

Enterotoxemia in Adult Cattle

The finding in the intestine of an animal of *Clostridium welchii* and its type D toxin is usually considered as justifying a diagnosis of enterotoxemia. In Australia, in June, 1951, 4 of 120 cows grazing chiefly on barley grass became similarly ill. Two died overnight; the other 2 failed to respond to calcium and other therapy and died in 24 hours.

Necropsy of 1 cow a few minutes after death revealed the pericardial sac distended with intensely red fluids, myocardial hemorrhages, hemorrhages in the tracheal mucosa, abomasum rather empty and congested, the jejunum and ileum containing a creamy ingesta with irregular area of intensely reddened mucosa, and the colon and feces normal except for excessive gas. The kidneys seemed normal except for a few petechiae. The serum calcium and magnesium levels were normal but the inorganic phosphorus was high. Smears and cultures from inflamed areas of the jejunum revealed that 90 per cent of the organisms were of the *Clostridium welchii* type but few such organisms were in the ileum.

A filtrate of the jejunal ingesta, when injected intravenously, killed all of 7 mice but none of 6 to which type D antitoxin was given simultaneously.—*Austral. Vet. J., Oct., 1954.*

NUTRITION

Urea of No Value in Pig Feed

The addition of 1.0 to 1.5 per cent urea to a low protein (10.6%) ration for weanling pigs had no significant effect on the feed consumption or the rate of gain but these pigs required 6.0 per cent more feed per pound of gain than pigs fed a normal protein (14.5%) ration. Urea caused no clinical toxicity.—*J. Anim. Sci., Feb., 1955.*

Fats Hold Carotene in Alfalfa Meal

When animal fats or vegetable oils were added to dehydrated alfalfa meal, they stabilized the carotene content. The stability increased as oil content was raised from 1 to 5 per cent. The carotene loss, during a four-month storage, was 28 per cent in meal containing 5 per cent of the oils compared with 53 per cent in non-treated meal.—*J. Agric. and Food Chem., Jan., 1955.*

Pelleted Feed for Lambs

When lambs were given the same feed, either hand-fed when unpelleted, self-fed when unpelleted, or self-fed when pelleted, their daily average gain was 0.31, 0.34, and 0.43 lb. per day respectively, and the feed per 100 lb. of gain was 972, 908, and 772 lb. respectively. Pelleting saved 20 to 30 per cent of the feed and one-fourth of the feeding time to reach market weight.—*Agric. Res., June, 1955.*

Rock Phosphate and Bovine Fluorosis

In a study of dairy cattle affected with chronic fluorosis in Canada, the source of excessive fluorine appeared to be a mineral supplement in which raw rock phosphate was used as the source of calcium and phosphorus. In the most seriously affected herd, eating, milk production, and physical condition had deteriorated. For the previous five years, this herd had been fed a grain mixture containing 2 per cent of the mineral mixture. Only the incisor teeth which had developed during that period were affected. There was a tendency toward elongated toes but the common lameness gradually disappeared each summer while on pasture. An analysis showed that the mineral supplement had a fluorine content of 20,300 p.p.m. for a total daily intake of 5.976 mg./kg. of body weight. In each of the three herds studied, several cases of acetonemia had occurred in recent years.—*Canad. J. Comp. Med. and Vet. Sci., Jan., 1955.*

Iodine Requirement of Chickens

Tests on the iodine requirements of chickens, carried through several generations, indicated that the minimum requirement was 0.5 mg. of iodine per pound of ration, with a maximum tolerance of 22 mg. for chickens under 6 weeks of age and 82 mg. for older birds. The iodine is usually added in the form of iodized salt.—*Am. Feed Mfr. A. Nutr. Abstr., Jan., 1955.*

Vitamin E and Embryonic Avian Eyes

When turkey hens were fed an all-vegetable protein ration without added vitamin E, the embryos from their eggs showed a cloudiness of the lens and a hemorrhagic condition of the vitreous humor. The embryos were smaller than normal, had edematous necks and feet, and some late mortalities. The condition was prevented by the addition of *alpha*-tocopherol acetate but not by fish solubles or dried whey.—*Vet. Bull., March, 1955.*

Toxicity of Cod Liver Oil.—Many deaths and a high percentage of severe muscular dystrophy occurred when 1 to 4 oz. of cod liver oil was given in dried skimmilk, daily, to 28 young bull calves. The nervous system was not involved nor were the liver and kidneys.—*Vet. Bull., May, 1955.*

Effect of Alfalfa on Swine Carcasses.—A carcass analysis of 72 hogs raised on four levels of alfalfa meal, ranging from 0 to 50 per cent of their pelleted ration, showed that as the alfalfa content increased, the depth of back fat decreased, while the percentage of shoulder, ham, and loin cuts.

as well as the weight of the stomach and large intestines, increased. The length of the carcass, the weight of the spleen, liver, and small intestines was not affected.—*J. Anim. Sci., May, 1955.*

Trees Converted to Feed by Radiation

Waste atomic radiation is now available in sufficient quantities to economically transform forests into cattle feed. Wood was first made suitable for livestock feeding in Germany during World War II by a process of hydrolysis in a slightly acidic bath, which resulted in the cellulose being separated from the indigestible lignin fibers.—*Sci. News Letter, March 5, 1955.*

Fungicide Affects Egg Laying.—When a 700-bird pen dropped from 500 to 20 eggs per day, all soft-shelled, and flocks on six other farms performed likewise, the cause was found to be a fungicide—treated seed corn which had been used in their feed. The condition was produced experimentally, with recovery, when the fungicide (arasan) was removed. The eggs were soft-shelled because they were expelled immaturely.—*Feeds Illustrated, May, 1955.*

Antibiotic Plus Vitamin Therapy

Since malnutrition with lowered resistance may be an important factor in certain types of infections, and since the need for nutritional support is often associated with the decreased intake, routine vitamin supplementation with other therapy is probably indicated. Research indicates that the intimate addition of vitamins to antibiotics does not interfere with the development of antibiotic blood levels.—*Antibiotic Med., May, 1955.*

Sulfonamide Poisoning in Chickens

Sulfonamide therapy for fowl coccidiosis in Great Britain poisoned many birds, especially those 4 to 6 weeks of age. Sodium sulfaquinoxaline (0.06%) in the drinking water for four days produced hemorrhagic lesions which were comparable to those of "hemorrhagic syndromes" in the United States. The drug was more toxic in the drinking water than in the feed, and chicks raised indoors seemed more affected than those outdoors on grass.—*Vet. Bull., April, 1955.*

Reactions to Feeding Stilbestrol.—When 40 steers and 10 heifers were fed 10 mg. of stilbestrol daily in a Kansas State College experiment, there was no significant difference in the rate or cost of gain. Stilbestrol consistently lowered the digestibility of the rations, while high tailheads and weakness in the loin region developed in both sexes.—*Kansas Stockman, June, 1955.*

Hydrocephalus and Vitamin A.—A hydrocephalic condition is often present at birth in the offspring of female rats which have been fed on vitamin A-deficient rations for long periods before mating. A similar condition had been reported in rabbits.—*Vet. Bull., April, 1955.*

Feeding Irradiated Animal Flesh.—When the flesh of cows and sheep which had been lethally irradiated with *gamma* radiation from cobalt-60 sources was fed to 15 weanling pups, no evidence of any harm as a result could be found.—*Science, June 24, 1955.*

Vitamin T, a Growth Factor for Pigs.—In Germany, when a growth factor, "tevita," containing vitamin T, together with minerals and vitamin D was fed in milk to unthrifty pigs, they showed a considerable weight increase.—*Vet. Bull., June, 1955.*

Riboflavin (vitamin B_2) deficiency can cause skin eruptions in most animals; in chicks the first sign is curled toes.—*Highlights in Agric. Sci., June 15, 1955.*

Rabbits born to dams with vitamin A deficiency developed convulsions and paralysis three to ten weeks after birth, and 26 of the 35 had hydrocephalus.—*Vet. Bull., June, 1955.*

A deficiency of both vitamins K and E produced lesions of the heart muscles in mice.—*Vet. Bull., June, 1955.*

Kittens fed penicillin and aureomycin® in a 50 per cent protein diet grew better and were healthier than controls.—*Vet. Bull., June, 1955.*

EDITORIAL

The Bovine Brucellosis Eradication Program Is Reaching Maturity

After 20 years of more or less trial and error methods, the National Brucellosis Eradication Program seems now to have developed a sound, workable formula. As proposed, it offers the herd owners a choice of several control plans, making it possible for each eventually to have an accredited herd without risking the loss of many animals. With the added incentives of (1) the broadened requirement that market milk be from brucellosis-free herds and (2) the availability of greater indemnities and expense payments from the $15 million federal fund, states are rapidly revising their laws and regulations accordingly. Furthermore, with the public now well aware of the dangers of brucellosis in man, the program should have a good chance of succeeding.

When first instituted in 1934, "Bangs disease" eradication was a part of a federal program for reducing the depression-time surplus of cattle. Encouraged by the favorable progress made in bovine tuberculosis eradication, some may have envisioned a relatively quick success, but the nature of the two diseases were too dissimilar for many of the lessons learned with one to be applicable to the other.

An impressive warning that the original plan could not be expected to succeed had been given in 1931 when tuberculin testing, in spite of its definite progress and benefits, was interrupted by the "cow war" in southeastern Iowa. To continue the tuberculin testing, the governor of the state had to call in National Guard troops to quell the obstructive tactics of a group of farmers and other persons who had been misled by the radio rantings of a "cancer specialist" who had his supporters convinced that tuberculin, when injected into an animal could cause tuberculosis and that the veterinarians doing the testing were getting a "kick back" from the packers for condemning healthy animals, requiring them to be sold at salvage prices.

If that could happen with a slowly transmitted chronic disease like tuberculosis, what would happen if testing for a quick-spreading, acute condition such as brucellosis were made compulsory? An editorial in the JOURNAL (Dec., 1931: 721) concerning the uprising said [we] "question the soundness of a policy based on compulsion. A law is only as strong as the public sentiment behind it." Nevertheless, brucellosis testing in the nation rose from 3.3 million cattle (11.5% reactors) in 1935 to 8 million (5% reactors) in 1937, after which it declined.

Part of the reasons for the decline were economic; the depression was receding, the cattle surplus had been reduced, and the program was costly. However, the inherent weakness in the plan alienated many participants. It soon became obvious that in areas where the herds were separated by short distances, frequently by just a wire fence, the tested herds often were like good apples left among bad ones. Unless the entire area was tested, the effects were only palliative and sometimes "treadmillish." Even when an entire area was included, eliminating the disease, especially in nondairy herds, too often resulted in eliminating the herd. This was less true after the interval between tests was reduced from 60 to 30 days, but even then an animal could be negative or suspicious on one test and spread the infection by aborting before the next test. Sanitary measures also seemed ineffective at times. The animals which had developed resistance were slaughtered, the susceptible ones remained.

The release in 1941 of strain 19 vaccine for general use brought a welcome aid to those who were actually dealing with the diseased herds, but for too long its use was discouraged by others who clung to the hope that somehow the agglutination test alone might yet be the means of bringing the disease under control. However, the success demonstrated by the use of the vaccine alone or in combination with testing finally has won proper recognition.

Undoubtedly the most futile feature of the earlier brucellosis control plan was the failure of the states, until recent years, to attempt to control the intrastate traffic in breeding cattle. With their eyes fixed on the state boundaries, where the shift from train to truck shipping produced sizable leaks in interstate control, they did not see the tremendously greater damage which usually resulted from intrastate trading.

There were, for instance, dealers who would accummulate numbers of heifers, many from other states and presumably tested, then pasture them with local herds until they were more salable (and often Brucella-infected) after which, with no tests required, they were sold at sale barns or, privately, to many herd owners. Farmers and breeders also could sell infected, untested animals or herds at all types of sales with no restrictions.

Now with many states requiring a "clean test" for all sales, private or public, of breeding cattle, with certain exceptions made for so-called "vaccinates," the vehicle is at hand for greatly reducing the spread of bovine brucellosis. Regulations may require further revisions in some states. Also much has yet to be learned about enforcement of the improved regulations, about the exemptions to be allowed these "vaccinates," and about the protection of cattle from infection via other species.

However, a proper start has finally been made and bovine brucellosis eradication becomes a possibility.

A Happy Medium in Size of the Newborn

Among the factors involved in the heavy loss of baby animals is their relative size at birth. A study of lambs (*Austral. Vet. J.*, April, 1955) indicates that, of the 12 per cent lost before they were 1 month old, the average weight of those which were stillborn was greater than of the survivors, while the average of those which died after birth was below normal. The same doubtless is true in all species, but it is especially obvious in the species which produce litters. Yet, associated with the swine industry (not the swine obstetricians) are persons who urge the use of this or that hog feed which it is claimed will result in "big, strong pigs." Why not try for middle-sized strong pigs to reduce the losses from dystocia.

Actually, the number of young in the litter probably is a bigger factor in determining fetal size than is the feed, and with immature dams the good feed will probably increase their size more, proportionately, than it will the size of their young.—W.A.A.

JOURNAL to Be Issued Semimonthly

Starting in January, 1956, the JOURNAL of the AVMA will be issued semimonthly, on the first and fifteenth of each month.

This change to a semimonthly is the result of a two-year study by the AVMA of the publication of a separate journal for small animal medicine. The Executive Board, after serious consideration, voted in favor of a semimonthly which they believed would better serve the profession as a whole.

The 24 issues per year will make the JOURNAL less bulky, possibly more completely read, and will somewhat decrease the time lag between the receipt and the printing of news and articles of current interest to the profession. There is no object in printing material which will not be read by the subscribers, and it is felt that the busy reader is more apt to give his attention to a newly received publication than to one which has been on his desk for several days or weeks. If that be true, the total attention given per month should be greater if the JOURNAL is received and perused twice per month instead of once per month.

This will be the second marked change in the JOURNAL in the 40 years since its inception as the JOURNAL of the American Veterinary Medical Association in 1915. The only other marked change occurred in 1938 when the over-all page size was increased from 6 by 8¾ to 7 by 10 inches and the printed page area from 4 by 6¾ to 5½ by 8 inches, a page capacity increase of about 60 per cent.

The total reader material per month definitely will not be doubled but an increase is inevitable. The backlog and time lag for unpublished articles has been increasing in recent months. However, the object is to keep the JOURNAL smaller, the time lag shorter, and the news fresher.

CURRENT LITERATURE

ABSTRACTS

Cryptococcus Neoformans Isolated from Cattle

Ethyl vanillate (ethyl 4-hydroxy-3-methoxy-benzoate), paraben (*n*-proply-*p*-hydroxybenzoate), polymyxin B (aerosporin®), and neomycin sulfate were inhibitory for *Cryptococcus neoformans, in vitro.*

Ten per cent roccal,® 3 per cent hydrogen peroxide, 30 per cent hydrogen peroxide, 3 per cent cresol, 70 per cent alcohol, 95 per cent alcohol and 1 normal, sodium hydroxide (1N, NaOH) exhibited a cryptococcicidal effect when in contact with mixed suspensions of *C. neoformans* for 15 minutes.—[*Joseph Simon: In Vitro Inhibition of Mixed Strains of Cryptococcus Neoformans Isolated from Cattle. Am. J. Vet. Res., 16, (July, 1955): 394-396.*]

Blood Phosphorus, Calcium, and Vitamin A in Sheep

The means of 517 determinations of levels of inorganic phosphorus, readily ionizable calcium, and vitamin A in the blood plasma of 144 breeding ewes on a range typical of the drier foothills of southwestern and south-central Montana were approximately as follows: phosphorus, 4.3 mg./100 ml.; calcium, 9.2 mg./100 ml.; and vitamin A, 29 μg./100 ml. The samples were taken in groups of 30 to 52 on 12 dates over a four-year period — 11 of the periods were between October 9 and April 1. One set of 46 samples taken July 2 showed a higher phosphorus level, *i.e.*, 5.4 mg./100 ml. Ewes fed a protein concentrate during the period of pregnancy did not show values significantly different from those for ewes on range with no supplement.—[*Hadleigh Marsh and Karl F. Swingle: Blood Phosphorus, Calcium, and Vitamin A in Range Sheep. Am. J. Vet. Res., 16, (July, 1955): 418-424.*]

Identification of Pasteurella Multocida

A hemagglutination test is described for the identification of serological types of *Pasteurella multocida.* This technique yields highly specific reactions and is considered to have advantages over other typing methods. The specific capsular antigens and hyaluronic acid capsular material were extracted with saline and adsorbed to human type 0 erythrocytes. To these treated cells were added appropriate dilutions of the specific typing serums. Positive reactions consisted of agglutination of red cells. A total of 122 strains of *P. multocida* from various geographic sources and animal species were typed by the hemagglutination test. Four different serological types, A, B, C, and D, were recognized. A large number of mucoid strains and noncapsulated cultures which could not be typed were also found. The serological results are discussed briefly in relation to the nature and occurrence of pasteurellosis in the various species.—[*G. R. Carter: Studies on Pasteurella Multocida. I. A. Hemagglutination Test for the Identification of Serological Types. Am. J. Vet. Res., 16, (July, 1955): 481-484.*]

Vesicular Stomatitis and Vesicular Exanthema Differentiation

A method of detecting and differentiating vesicular stomatitis (VS) and vesicular exanthema (VE) by a complement-fixation test is described. The reactions are type specific for the two strains of VS virus which were propagated in embryonating chicken eggs. No serious cross fixation was evident with types A_{48}, B_{51}, C_{52}, and D_{52} VE virus. The marked differences in degree of fixation between VE and VS viruses and the similarity of serological behavior of VE to foot-and-mouth disease virus are discussed.—[*R. A. Bankowski and Mary B. Krummer: Vesicular Stomatitis and Vesicular Exanthema Differentiation by Complement Fixation. Am. J. Vet. Res., 16, (July, 1955): 374-376.*]

Effect of Route of Newcastle Disease Infection

The infectivity of a highly pathogenic strain of Newcastle disease virus (NDV) to chickens 3 to 6 weeks of age was quantitatively studied by the intramuscular, respiratory, intranasal, and alimentary routes.

The alimentary infection was induced by intracrop instillation of virus suspensions. The respiratory exposure was either by intratracheal instillation or by breathing an infective aerosol under accurate control.

Chickens were found to be most susceptible to infection by intramuscular or respiratory routes. Approximately 100 $e.l.d._{50}$ (embryo lethal doses) of the virus was required to initiate an infection. The intranasal route required 40 to 50 times more virus and 2×10^4 $e.l.d._{50}$ were necessary to infect chickens by the alimentary route. Parentally immune, 1-week-old chicks were less susceptible to NDV given intramuscularly or intranasally than were 3- to 6-week-old chicks.

Quantitative estimation of highly pathogenic virus excreted in feces of an infected chick was made. During the maximum excretion, 25 mg. of feces was calculated to be sufficient to infect a chick via the alimentary tract.

A scheme of the natural spread of NDV in nature is given and it is concluded that the main natural route of infection is the lower respiratory tract.—[*A. Kohn: Quantitative Aspects of Newcastle Disease Virus Infection—Effect of Route of Infection on the Susceptibility of Chicks. Am. J. Vet. Res., 16, (July, 1955): 450-457.*]

5-Hydroxytryptamine in Large Domestic Mammals

To determine the occurrence and distribution of 5-hydroxytryptamine (5-HT) in the gastrointestinal tract of some large domestic mammals, bio-assays with extracts of portions of the gastrointestinal tract and spleen tissue were carried out on the isolated uterus of the rat in estrus. In ruminants 5-HT is present only in the fourth stomach. It is detectable in the pig's stomach and the entire intestinal tract of all tested animals, the largest amount being found at the beginning and end of the intestinal tube.

Enterochromaffin cells were found in the intestinal mucosa after the fifth or sixth week of intrauterine life. Traces of 5-HT can be detected at the same time also in the embryonic spleen as soon as it can be identified.

This supports the hypothesis that intestinal 5-HT originates from the enterochromaffin cells of the gastrointestinal mucosa before spleen tissue exists in the fetus. Its presence also in the splenectomized rat seems to invalidate the hypothesis of the formation of 5-HT in the spleen.—[*Remo Faustini: The Enteric Distribution of 5-Hydroxytryptamine (Enteramine, Serotonin) in Some Large Domestic Mammals and the Appearance of 5-Hydroxytryptamine and the Enterochromaffin Cell System in the Embryonic Calf. Am. J. Vet. Res., 16, (July, 1955): 397-400.*]

Trichostrongylus Axei in Calves

Ten Holstein-Friesian calves, 3 to 6 months old, were given 50,000 to 1,500,000 Trichostrongylus larvae (95% estimated to be *Trichostrongylus axei*). The prepatent period in single and multiple infections was 19 to 30 days. Maximum egg counts usually occurred 26 to 30 days after patency and, in one instance, at 17 days. Resistance to heavy reinfection four to five months after egg counts from initial infection had subsided was shown by 2 calves. Loss of weight, weakness, loss of appetite, and watery feces were evident when calves were given doses of 750,000 or more larvae. A calf given 1,000,000 larvae was killed *in extremis* 49 days after infection and 1 given 1,500,000 larvae died 49 days after infection. Although not producing clinical symptoms, exposure to less than 750,000 larvae produced gross pathological changes in the abomasum, *i.e.*, "ringworm-like" lesions, inflammation, and corrugation of the mucosa; also histopathological changes, such as sloughing of the epithelium, hyperemia, and lymphocytic infiltration. These changes varied roughly with the number of larvae administered.—[*David J. Doran: The Course of Infection and Pathogenic Effect of Trichostrongylus Axei in Calves. Am. J. Vet. Res., 16, (July, 1955): 401-409.*]

Record Maintenance for Monkey Colony

Description of a thorough record system for a large, long-term monkey colony is described in detail, with figures. The record system described employes the reduction of data into accessible and easily read chart and list forms. The system has duplication of information, but chart representation of often-needed specific information has been found to save time and reduce confusion. The importance of a kardex file for rough draft entry and extraction of information on individual animals prior to final entry into the permanent record of the animal is noted in the system described.—[*B. D. Fremming, R. E. Benson, R. J. Young, M. D. Harris, and D. S. Nachtwey: Record Maintenance for Long-Term Monkey Colony. Am. J. Vet. Res., 16, (July, 1955): 470-471.*]

Genetic Resistance to Salmonella Pullorum in the Fowl

Body temperatures and blood counts were recorded daily from 1 to 10 days of age for 225 normal crossbred chicks, from 2 sires and 22 dams, all brooded at the optimum temperature of 35 C. Temperatures rose rapidly during the first 5 days of age, to a mean of 105.8 F., and thereafter more slowly to 106.4 F. at 10 days. Significant differences were found between the chicks of the 2 sires and 22 dams at 1 to 5 days of age. Ten high-temperature families were differentiated from 12 low-temperature families. The high-temperature families maintained consistently higher body temperatures than the low-temperature families when both were brooded at 30 C., but this genetic difference was obliterated in chicks brooded at 40 C. When 621 additional chicks from these families were inoculated with *Salmonella pullorum*, mortality was consistently and significantly lower in chicks of the ten high-temperature families. In the high-temperature families, the mortality was 31.7 per cent; in the low temperature families, 67.4 per cent. Susceptibility of inoculated chicks was increased when they were brooded at a low temperature (30 C.) but was consistently reduced in chicks subjected to hyperthermia by being brooded at 40 C. Among inoculated chicks, those that survived maintained temperatures higher than in those that died, following an initial fever in both groups. Familial differences in lymphocytes (%) were insignificant and unrelated to mortality of inoculated chicks. Brooding chicks at 40 C. depressed the lymphocyte count, but raised both body temperature and resistance; at 28 C., lymphocyte counts were depressed less, but temperatures and resistance were much reduced. No significant relation could be detected between size of spleen and resistance. White Leghorns had consistently higher lymphocyte counts (%) and much greater resistance to *S. pullorum* than Rhode Island Reds, but crossbred

chicks, which had lymphocyte counts even lower than Rhode Island Reds, were equal to White Leghorns in resistance. Metabolism tests showed the heat production of chicks from the high-temperatue families to be greater by about 20 per cent than that of chicks from low-temperature families. It is concluded that high body temperatures at 1 to 5 days and the superior thermoregulatory control associated with them accelerate defense mechanisms such as phagocytosis, bacteriolysis and the production of antibodies.—[*Tulsa Ram and F. B. Hutt: The Relative Importance of Body Temperature and Lymphocytes in Genetic Resistance to Salmonella Pullorum in the Fowl. Am. J. Vet. Res., 16, (July, 1955): 437-449.*]

FOREIGN ABSTRACTS

Traumatic Gastritis in Cattle

An adapted mine detector was used successfully in differential diagnosis of traumatic gastritis in cattle. The operative procedure involves removal of the wire, nails, or other metallic objects by rumenotomy. The results of this operation have been good when early diagnosis is made.—[*A. A. Najle: Early Diagnosis and Surgical Treatment of Traumatic Gastritis in Cattle. Rev. de Med. Vet., 36, (1954): 65-75.*]—G.T.E.

Successful Treatment of Warts of Cattle

Tincture of thuja has been used successfully on surface warts of the head, neck, and shoulder regions of cattle, as well as for those found inside the mouths of dogs. It consists of 50 Gm. of finely macerated thuja leaves and 500 cc. of isopropyl alcohol which is allowed to macerate for five days. It is stirred daily during this time and then is strained through gauze. Usually, 14 to 21 treatments are necessary to remove the warts.—[*H. Ederly: A Successful Treatment for Warts in Cattle. Gac. Vet., 15, (1953): 72.*]—G.T.E.

Electroejaculation of Rams

A trial was made to collect semen from 113 rams by means of electrical irritation. Ninety-five animals produced semen of good quality at first examination; 10 animals after a second examination. No semen, or semen of insufficient quality, was obtained from 8 animals in spite of repeated examinations.—[*L. Van der Sluis and A. Van der Schaaf. Collection of Sperma in Rams by Electric Irritation. Tijdschr. voor Diergeneesk., Dec. 15, 1954.*]—L.V.E.

Effect of Trauma on the Spine of the Dog

The role of trauma in the genesis of disc protrusions is a subject of much discussion. Disc degeneration in certain breeds of long-backed dogs is a systemic disease dependent on constitutional factors. The disc prolapses which result from this degeneration appear in those parts of the spinal column which are subjected to the greatest mechanical stress. However, there are cases in which a single violent trauma has caused the rupture of a disc, degenerated or not. It is for these cases that the diagnosis of "traumatic disc prolapse or disc rupture" should be reserved.

In order to throw further light upon the trauma and disc injury connection, a group of 122 cases was studied to investigate the effect of a single, violent trauma on the spinal column. Fractures of the vertebral bodies were about twice as frequent as disc ruptures. The two types of dogs, those with long or with short bodies, were examined to see if disc rupture was more frequent in one type than in the other. Although the chondrodystrophoid (long-backed) dogs are strongly disposed to disc injuries, and the nonchondrodystrophoid (short-backed) dogs are seldom bothered, there was no statistical difference between the two types concerning fracture of vertebral bodies and disc rupture. However, fractures of the vertebral bodies were somewhat more common in young than in older dogs but many of these are likely to be classed as traumatic epiphysiolysis.

In conclusion, the long-back type of dog does not show a greater frequency of disc rupture in comparison to fractures of vertebral bodies than do other dogs. Also, the effect of a single violent trauma on the spine of the dog will more often be a fracture of a vertebral body than a disc rupture. Age and breed are not significant factors. Thus the effect of a single, violent trauma on the spinal column of the dog differs in every essential respect from that found in the usual type of disc protrusion in the dog.—[*Hans-Jorgen Hansen and Sten-Erik Olsson: The Effect of a Single Violent Trauma on the Spine of the Dog. Acta orthop. Scand., 24, (1954): 1-7.*]—W.R.

BOOKS AND REPORTS

Breeding Beef Cattle for Unfavorable Environments

This book presents the symposium held at the King Ranch Centennial Conference in October, 1953. In Part I are discussed the problems of environment: the effect of climate upon animal health and reproduction; the relationship of soil fertility and animal nutrition to production; and the improvement of range grasses in semiarid regions. Part II emphasizes the necessity of adapting the cattle to the environment, rather than attempting to maintain a completely artificial environment for animals that are not apt to adjust properly to the natural conditions. Scientists report on breed improvements in South Africa and Brazil, as well as the United States.—[*Breeding Beef Cattle for Unfavorable Environments. Edited by Albert O. Rhoad. 248 pages. Well illustrated. University of Texas Press, Austin 12, Texas. 1955. Price $4.75.*]—W. A. AITKEN.

Radioisotopes in Biology and Agriculture

This is a compilation bringing together in one volume the necessary biological and chemical information for planning and carrying out radioisotope tracer studies. It is illustrated by examples from the fields of physiology, nutrition, entomology, soils, and fertilizers. It describes the facilities required and procedures suitable for studies with domestic animals, laboratory animals, and plants. It indicates that radioisotope procedures have been developed to the point where any biologist with some background in quantitative chemistry can apply them successfully.—[*Radioisotopes in Biology and Agriculture. By C. L. Comar. 481 pages. 91 figures. 54 tables. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, N. Y. (Toronto and London). 1955. Price $9.00.*]—W. A. AITKEN.

Brucellosis

This book on brucellosis in man contains 11 chapters, with an English summary following each.

The first chapter deals with the problem of brucellosis and is followed by a discussion of the bacteriological aspects of Brucella.

Two chapters are devoted to the immunological and hematological studies on brucellosis, followed by a critical study of the most useful diagnostic procedures in its diagnosis.

In the discussion on the epidemiology of the disease, it is concluded that an analysis of epidemiological statistics shows a great discrepancy in the collection of data.

A lengthy chapter is devoted to the clinical symptomatology and the effect of therapy with antibiotics on the disease in man.

In a chapter devoted to histopathology and pathogenesis, available information gathered from past observations, as well as from recent studies of specimens obtained by biopsies is summarized. These studies were based on observations in man and laboratory animals. A summary is also presented of the actual knowledge of chemotherapy.

The final chapter deals with the control of brucellosis in man. These controls are designed to interfere with the transmission of the infecting organism.

This book should be of interest to Spanish-speaking people working on the problem.—[*Brucellosis. By M. Ruiz Castaneda. 302 pages. 29 figures. 19 tables. La Prensa Medica Mexicana, Mexico, D. F. 1954. Price $5.*]—W. G. VENZKE.

Antibiotics Annual

This edition of "Antibiotics Annual" is valuable in nearly all areas of veterinary medicine, especially for teaching. It is proportionately more helpful to the veterinary clinician than the first because antibiotic research has reached the stage where clinical investigation is as common as laboratory experimentation. It contains 172 articles dealing with recent research and clinical uses of antibiotics in man, domestic animals, and some laboratory animals.

The articles range over a wide variety of subjects including the "older antibiotics" as well as those discovered in recent months. A considerable number of articles deal with tetracycline, oxytetracycline, erythromycin, carbomycin, and neomycin.

Veterinary clinicians will be particularly interested in tetracycline in veterinary medicine; the clinical use of antibiotics in domestic animals; antibiotics in mastitis; carbomycin in the distemper complex; presurgical preparation of the intestine with neomycin and other antibiotics; oxytetracycline and carbomycin in animal feeds; intramuscular injections of oxytetracycline and tetracycline; neomycin intraperitoneally in peritonitis; the tetracyclines in urinary tract infections; and control of Salmonella and Shigella infections by antibiotic therapy. These subjects are examples of applied information about the clinical use of antibiotics. In addition, there are articles of more fundamental interest which may prove more important to the veterinary practitioner than those mentioned.

This book is the best and most extensive survey of recent information available in one volume about the characteristics and uses of antibiotics.—[*Antibiotics Annual 1954-1955, Proceedings of the Second Annual Symposium on Antibiotics. Edited by Henry Welch and Felix Marti-Ibanez. Illustrated. 1145 pages. Medical Encyclopedia, Inc., East 60th Street, New York 22, N. Y. Price $10.*]—L. MEYER JONES.

Anatomy of the Sheep

This book contains a brief description of the body cavities and their content and of the limbs. The description of the structures of the head and neck will be included in a later edition. Osteology and arthrology are not included. Directions for dissection appear at appropriate places in the text.

The arrangement of the description is by regions in the order in which they are approached during the dissection — a convenient approach for the student but lacking the continuity of the systemic approach. For example, the description of the ulnar nerve is regional and appears in four different places. The action of various muscles is not mentioned.

The book is illustrated with photographs and a few diagrams. In many of the photographs the contrasts are not sufficient to give a readable picture. The diagrams are small and difficult to interpret. A table, covering 12 pages gives comparisons of visceral organs for the horse, ox, sheep, pig, and dog.

Any additions in the field of anatomy are welcome, particularly when the descriptions are of food-producing mammals. The author is to be commended for his efforts in the field of anatomy.—[*Anatomy of the Sheep. By D. S. May. 158 pages. Illustrated. Watson, Ferguson and Co., Brisbane, Q., Australia. 1955. Price not given.*]—M. W. MCLEOD.

Index

To Streptomycin and Neomycin in Veterinary Medicine

Streptomycin and Neomycin in Veterinary Medicine

HERMINIE B. KITCHEN, M.A., and SELMAN A. WAKSMAN, Ph.D.

New Brunswick, New Jersey

The veterinarian, as well as the livestock and poultry raiser, is finding more and more uses for streptomycin and neomycin in the treatment of diseases, especially those of an infectious nature, in both large and small domestic animals, in poultry, and in furbearing animals kept in captivity. Streptomycin, alone or in combination with penicillin, is valuable in controlling the growth of contaminating bacteria in diluted bull's semen used for artificial insemination. Addition of streptomycin and other antibiotics to the rations of chickens, turkeys, geese, pigs, and young calves is one of the major developments in feeding practices in recent years. The first demonstration of such effectiveness by an antibiotic took place in 1946, with the direct predecessor of streptomycin, streptothricin.

Today, the literature on the uses of streptomycin and neomycin in the care and management of flocks, herds, and household pets constitutes a library in itself. Reports on new therapeutic and nutritional effects are appearing daily. Many of the reports show conflicting findings. Many record striking results with these two antibiotics. The purpose of this paper is to review the most recent studies on the veterinary applications of streptomycin and neomycin.

For several reasons, the two antibiotics are considered together: (1) They are both basic compounds and possess similar physical and chemical properties, notably solubility and stability. (2) They are similar in their general biological properties, such as their activity against gram-positive, gram-negative, and acid-fast bacteria. (3) In certain diseases, they can be used interchangeably although, in many other instances, one is preferable to the other. (4) Many of the investigations in the treatment of animal diseases have been carried out with both antibiotics and the results may, therefore, be thus reported. (5) They were both isolated in the same laboratory. Actually, the method of isolation and the broad outlook of potential activities of these antibiotics were first developed for streptothricin, the first basic antibiotic isolated in our laboratory. This was later followed by streptomycin and still later by neomycin.

Properties of Streptomycin and Neomycin

Streptomycin* and neomycin alone and in combination with other antibiotics and chemotherapeutic agents, are available for veterinary use as dry powders, tablets, solutions, ointments, troches, and bougies. In the chemical forms in which they are used as antibiotics, both are readily soluble in water and are relatively stable in aqueous solutions as well as in dry or ointment form.[31, 33, 34]

Both have bacteriostatic and bactericidal effects on a large number of gram-negative and gram-positive organisms, their activity in animal infections depending on the susceptibility of the infectious organism to the drugs under given conditions, as well as on the concentration achieved at the site of infection. Such concentration depends on the pharmaceutic form of the antibiotic, the route of administration, the dosage, and the condition of the patient. Neither the activity of streptomycin nor that of neomycin appears to be markedly decreased by body fluids, pus, or necrotic tissue, neither is inactivated by microbial enzymes, and both are most active at alkaline pH. They are indicated in the treatment of urinary infections of herbivorous animals, which usually have alkaline urine. Although streptomycin-resistant strains can be easily demonstrated in patients treated with this antibiotic, the development of neomycin-resistant strains of bacteria has not been reported clinically.

Absorption and excretion of streptomycin and neomycin seem to be similar in man and other mammals, as do their ototoxic effects. On the other hand, allergic reactions to streptomycin sometimes seen in human beings have not been found in animals. Neomycin has not been shown to produce allergic reactions in either man or animals.

Both streptomycin and neomycin may be administered orally for the treatment of gastroenteric infections and for preoperative and postoperative prophylaxis in bowel surgery.[34] Thus administered, both antibiotics are safe because they are poorly absorbed from the digestive tract and, therefore, can have no toxic effect on the patient. Moreover, they do not destroy the entire bacterial flora of the intestine and, therefore, do not have the untoward effects often seen in the

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The authors are indebted to members of the veterinary staffs of the research laboratories, institutes, and divisions of a number of pharmaceutical companies for critical reading of the manuscript and for many helpful suggestions.

*Hydrogenation of streptomycin produces the derivative dihydrostreptomycin. Since streptomycin and dihydrostreptomycin have equivalent antibiotic activity, they are discussed under the generic name "streptomycin" in this review.

use of some of the other antibiotics. They are found at high levels in the feces.

After oral administration of as much as 425 mg., streptomycin could not be detected in the blood plasma of cattle, but approximately 4 per cent was recovered in the urine. After dogs had been on neomycin for three days, the blood levels were extremely low, a maximum of 3 μg./1 ml. of serum, approximately 3 per cent of the neomycin being excreted by the kidneys.

Both streptomycin and neomycin have been used successfully in the treatment of skin and wound infections of animals. Alone and in combination with other chemotherapeutic agents, they have been found effective in treating experimental peritonitis in dogs.

Oral use of neomycin in combination with sulfonamide has been reported[10] to assure nearly perfect sterilization of the gut. Neomycin has been shown to be the most effective antibiotic in reducing postoperatively the number of pathogenic organisms in the intestinal tract. For controlling infections that often complicate surgery conducted in the field, it has been reported[2] more effective than other products used in the past and has materially decreased mortalities.

Massive oral doses of an antibiotic should, however, be avoided in ruminating animals and possibly in horses that rely on bacterial action to digest much of the roughage they consume. Antibiotics may have an adverse effect on the bacterial flora of the rumen and the large intestine of the normal animal and may produce digestive disorders. In this connection, it must be remembered that young cattle or sheep usually begin ruminating at the age of about 4 to 8 weeks.[11]

Both streptomycin and neomycin, alone and in combination with other chemotherapeutic agents, are used extensively for intramammary administration. They are nonirritating to the udder and are clinically effective against many types of bacteria causing mastitis. In normal bovine mammary glands, 100 to 500 mg. of streptomycin has been found to result in concentrations not below 20 μg./1 ml. of milk for as long as 40 hours. Concentration varies with the size of the dose, intervals between applications, and milk production of individual quarters.

Because of its wide antibacterial spectrum and its low index of sensitivity, neomycin has been found particularly effective in the treatment of ophthalmic diseases. When instilled into the rabbit's eye, it produced no toxicity. When applied locally, it showed ocular tissue tolerance and penetration. Injected subconjunctivally at the rate of 0.5 Gm./1 ml. of water, streptomycin has been found useful in the treatment of certain gram-negative ocular infections. It does not penetrate the deeper layers of tissue, however, and is not so satisfactory, therefore, as neomycin for treating local infections.

As a routine topical application in veterinary practice, neomycin has been found especially useful. Outstanding is its beneficial effect upon infected areas. Ointments and solutions of streptomycin, like those of neomycin, are used for local therapy, but to a limited extent.

Intramuscularly, neomycin has proved extremely valuable in certain septicemic and bacterial cellulitic conditions in small animals, but because of the ototoxic and nephrotoxic effects when administered parenterally, the use of this antibiotic for systemic effect is recommended at present only for severe infections with organisms resistant to potentially less toxic antibiotics.

Streptomycin, on the other hand, is effective parenterally for the treatment of a number of systemic infections of animals. It may be administered intramuscularly, intravenously, subcutaneously, and intraperitoneally. When administered intramuscularly or subcutaneously, streptomycin is rapidly absorbed into the blood stream. It is eliminated quickly by the urinary system and is excreted mainly by glomerular filtration. Under certain conditions, streptomycin, together with penicillin, has been used intrapertioneally to prevent or control infections in that cavity. To overcome most of the susceptible organisms, a minimum of 3 to 6 μg. of streptomycin per milliliter of plasma is considered necessary. In dogs, intramuscular administration of 5 mg. per pound of body weight has been found to result in a level of 6 to 11 μg./1 ml. of plasma after about four hours and about 100 μg./1 ml. in the urine in nine hours.

When injected into cattle intramuscularly, streptomycin was found to reach peak blood levels within one to three hours. Administration of 5 mg. per pound of body weight (1 Gm./200 lb.) gave as good effect from the standpoint of duration of significant blood levels as 7.5 mg. and it was irregularly excreted in the milk in small amounts. It has been tentatively suggested that streptomycin, when indicated for cattle, be administered intramuscularly at the rate of 5 mg. per pound of body weight every eight to 12 hours, if possible. In sheep that received a single intramuscular dose of 4 mg. of streptomycin per pound of body weight, an average of 16 to 32 μg./1 ml. of blood serum was found three hours after administration. Evidence has been presented suggesting that streptomycin is distributed throughout the extracellular fluids of the body and that little if any is present within the body cells. For equal intramuscular doses of streptomycin, per kilogram of body weight, the serum level responses of cattle, sheep, horses, dogs, and man are closely similar. Chickens, on the other hand, are reported to require eight times as great a dosage per kilogram of weight as these other species for equivalent serum concentration.[6]

It has been reported[10] that the optimal daily oral dosage level of neomycin for man and dog is the same—0.1 Gm./1 kg. of body weight, divided into six portions and administered on a four-hour schedule.

No toxic effects have followed the oral use of streptomycin, but excessive amounts administered parenterally (50 to 400 mg./1 kg.) may cause toxicity in animals as in man. However, few such cases have been reported in animals, probably because the course of medication is usually short. Signs of streptomycin toxicity in animals are restlessness, impairment of respiration, loss of equilibrium, occasionally convulsions, and coma. Cats and monkeys are the animals most likely to show neurotoxicity. Small cats and very small dogs given perhaps 1 Gm. of streptomycin daily for a week or so might develop toxic signs.[6]

For short and sharp therapy, streptomycin has been found to be of great value. It has found wide use in the management of infections caused by gram-negative organisms chiefly of the coliform group. Because of its high urinary excretion when administered parenterally and its bactericidal action on the pathogenic organisms commonly involved, streptomycin is an antibiotic of choice for urinary infections of animals. As used in animals, pure streptomycin has been found to be essentially free from nephrotoxic and hepatotoxic effects.

Combinations of streptomycin and neomycin with one or more other antibiotics or chemotherapeutic agents are used frequently to increase the antibacterial spectrum of activity.[6] Perhaps this procedure finds its widest utility in the intramammary treatment of bovine mastitis, especially where it is not certain whether the infective organisms are gram-positive, gram-negative, or both. In other animal infections, as well, it is difficult at times to know precisely the type of organisms responsible. Some of the organisms may be sensitive to one antibiotic and insensitive to another. Neomycin is added to the tetracyclines and to chloramphenicol to increase the effect against Pseudomonas organisms.[20] Streptomycin, neomycin, penicillin, bacitracin, polymyxin B, tyrothricin, and possibly erythromycin may be combined with one or more of the others to produce apparent synergistic effects that one antibiotic alone could not achieve.

Both streptomycin and neomycin are indicated in the treatment of infections caused by gram-negative organisms such as *Escherichia coli, Aerobacter aerogenes,* Salmonella and other coliform types, Vibrio, Shigella, and Hemophilus. Neomycin is more active than is streptomycin against the paracolon organisms, Proteus and *Pseudomonas aeruginosa.* Streptomycin is effective against Pasteurella, Leptospira, *Actinomyces bovis, Erysipelothrix rhusiopathiae,* and a few gram-positive bacteria not susceptible to penicillin. Neomycin has a wider range of activity *in vitro* than has streptomycin. It is active against many gram-positive organisms, though it is not very active against certain staphylococcic and streptococcic organisms.

The chief animal infections against which neomycin has been used successfully are bovine mastitis, conjunctivitis and keratitis, enteritis and diarrhea, furunculosis, otitis externa, skin infections, and infected wounds.

Streptomycin has proved to be of therapeutic value in such animal diseases as actinobacillosis, actinomycosis, bovine mastitis, calf pneumonia, calf scours, secondary bacterial invaders causing complications of canine and feline distemper, cystitis and nephritis of dogs, endometritis, enteritis and diarrhea, leptospirosis, otitis externa, pasteurellosis, shipping fever, sinusitis of turkeys, skin infections and infected wounds, swine dysentery, and swine erysipelas.

Both streptomycin and neomycin have found extensive therapeutic use in veterinary medicine.[18] Neither of the antibiotics is, however, a cure-all, and the importance of using antibiotics only against infections due to susceptible microorganisms can not be overemphasized.

Streptomycin as a Feed Supplement

One of the major developments in feeding farm livestock in recent years has been the use of antibiotics in the rations of certain animals.[11, 28] Research workers are generally agreed[19] that crystalline antibiotics, when added to rations containing either animal or vegetable proteins, stimulate growth, increase feed utilization or efficiency, and reduce incidence of digestive troubles and mortality in "stunted" animals. They stimulate the growth of chicks, turkey poults, and goslings except when they are maintained in a noninfected environment. They have also proved effective in increasing the growth rate of suckling and weanling pigs under many conditions[29] but especially where miscellaneous infections are known to exist.[22]

All antibiotics provide best results with young, fast-growing animals and when added to good feed. Most nutritionists caution that antibiotics can not be expected to replace vitamins, minerals, or amino acids in poultry rations.

No one antibiotic can be expected always to produce the best results, for these vary with differences in animal species, environment, and feed. But streptomycin has shown up well in promoting growth of poultry, pigs, certain laboratory animals, and young preruminating calves.

It has been suggested that certain antibiotics have a sparing effect on some nutrients, particularly proteins and some vitamins. Whether this is a direct effect or an indirect one brought about by promotion of a healthier digestive tract and consequent improved digestion and absorption of various nutrients is not known. However, antibiotics seem to exert their influence by altering bacterial conditions in the intestines. This influence, it has been suggested, may be due to: (1) inhibition of certain bacteria that destroy, or use for their own needs, essential nutrients derived from the ingested food; (2) stimulation of favorable bacteria to greater synthesis of useful nutrients; or (3) reduction of toxic products normally found in the intestine.

It has been suggested, but no evidence produced, that the food products from animals fed antibiotics might contain enough of these substances to reduce their effectiveness in the treatment of diseases in persons who consume these products.[12, 99] This problem does not arise with streptomycin, because it is not readily absorbed from the digestive tract. Little or no accumulation of antibiotics has been demonstrated in the edible tissues of animals fed antibiotics at levels of 2 to 7 Gm. per ton of feed, although the actual requirement of streptomycin is much greater.

The general conclusion seems to be that intelligent use of antibiotics in the rations of young, nonruminating animals is safe.

When newly hatched chicks are fed a ration containing antibiotics, the growth-stimulating effect is evident within a few days. The percentage of improvement in weights of treated birds is usually the greatest at the end of the first or second week. Whether antibiotics have much value as feed supplements during the latter part of the growing period is questionable.

Many investigators doubt that feeding antibiotics to hens improves egg production, hatchability, or chick quality. Others have concluded that egg production and hatchability or fertile eggs are improved to varying degrees by supplements of streptomycin or penicillin when the ration contains an abundance of vitamin B_{12}.[10]

Streptomycin has been found to stimulate the growth of geese[11] but apparently not that of ducks. Fed at the rate of 50 p.p.m. in the ration, it improved growth and efficiency of feed utilization of goslings kept for four weeks in wire-floored battery brooders and continued the improvement in the birds for an additional four weeks in pens on a grass range.

Streptomycin at a level of 66 mg. per kilogram of feed also increased the growth rate and improved the feed efficiency of turkey poults fed an all vegetable protein ration and maintained in battery brooders with raised screen floors. This report[9] confirmed an earlier one on poults raised in pens on litter.

In pig feeding, the optimum level for streptomycin seems to be 20 to 50 Gm. per ton of feed. As a supplement to nutritionally adequate rations, streptomycin alone or in combination with sulfathalidine® or penicillin has been shown, in many tests, to increase significantly the average daily gains in weight and to cause highly significant reductions in feed required per kilogram of gain.[13] Studies of the effects of vitamin B_{12} and streptomycin, as feed supplements, on the growth and fattening of weanling pigs showed that a combination of 8 to 10 mg. of vitamin B_{12} per ton and 15 mg. of streptomycin improved the growth rate and feed efficiency more than did a single addition of either.

Large Animal Therapy

STREPTOMYCIN

Alone or in combination with other antibiotics and chemotherapeutic agents, streptomycin has proved to be a great asset in the treatment of many infections of large animals. It is used widely in the management of infections caused by certain gram-negative organisms, chiefly those of the coliform group. In combination with such other antibiotics as penicillin, bacitracin, and neomycin, with which streptomycin may be synergistic, it often proves active against infections due to mixed gram-negative and gram-positive bacteria. Streptomycin has been used with considerable success in the treatment of many septicemic diseases of large animals as well as infections of the genital organs and of the urinary tract, enteric infections, and wounds and wound-infection diseases.

Combinations of streptomycin and other antibiotics have been a great asset in bovine mastitis therapy because the infected mammary gland usually contains mixed gram-positive and gram-negative bacteria. One of the most popular mixtures is streptomycin and penicillin in ointment form. Streptomycin and penicillin added to bovine semen reduce bacterial contamination prior to artificial insemination.[28] An increased conception rate follows.

The parenteral dosage schedule, though apparently well established, varies with the sensitivity of the pathogen, the stage, severity, and location of the infection, and the presence or absence of a bacteremia. When the route of administration is either intramuscular or intraperitoneal, the usual dose is 4 to 10 mg. per pound of body weight, repeated as often as necessary until recovery is evident, preferably one-third to one-half dose every eight to 12 hours.

SEPTICEMIC INFECTIONS

Many septicemic diseases of large animals respond readily to parenteral streptomycin therapy. The more promptly the treatment can be instituted, the more rapid and satisfactory will be the reaction.[61]

Among the cattle diseases affected by streptomycin or combinations of streptomycin with other chemotherapeutic agents, the most important are pneumonia, septicemia of the newborn, and septicemia as a complication of mastitis and metritis.

Pneumonia in Calves and Cows.—Calf pneumonia and shipping fever pneumonia respond well to certain antibiotic therapy. *Pasteurella multocida*, a gram-negative organism, is commonly involved in shipping fever. Streptomycin is effective for parenteral treatment of this disease,[93] and some workers have reported it to be definitely superior to penicillin as a therapeutic agent.[3] The most common form of the disease in dairy cattle is characterized by pneumonic symptoms. A septicemic

form occurs frequently. Treatment is usually successful, especially when instituted before pneumonic symptoms have progressed to an advanced stage. Streptomycin is given at a dosage of 1 to 2 Gm. twice daily or 3 to 5 Gm. once daily. In recent years only cattle that show fever, dyspnea, or anorexia are treated. Results are satisfactory and less expensive than when serum is used on all exposed animals.[48]

The consensus seems to be that in severe cases of pneumonia in cows or calves, antibiotics may be used alone in high, continued doses or combined with sulfonamide therapy. Success was reported with 250 mg. of streptomycin dissolved in 5 ml. of sterile saline solution administered intramuscularly to young calves four times daily for four to five days.

Leptospirosis of Cattle.—Leptospirosis is another septicemic disease of cattle that may respond to streptomycin therapy. Practitioners and research workers have reported[21] that large doses may hasten or make more certain recovery and may eliminate the organism from the body so that the usual carrier period following initial infection does not occur. More work needs to be done on this disease.

Colt Septicemias.—Septicemia of newborn and older colts responds to streptomycin therapy.[35, 44] Septicemia of newborn foals is mainly due to Shigella, coliform, or streptococcic organisms.[40] The first two infections react to streptomycin given intramuscularly every four to six hours and continued for 36 to 48 hours after the colt appears normal. Since, clinically, one can not readily differentiate between the infections, pencillin in large doses is usually administered also.[21] Of the microorganisms causing morbidity and mortality in young foals, *Shigella equirulis* and streptococci are said to be the most important. The clinical manifestations are called navel ill, pyosepticemia, joint ill, pyarthrosis, and omphalophlebitis.

Streptomycin is an effective agent for treatment of *Shig. equirulis* infections of newborn foals. Alone or in combination with penicillin it appears to have considerable merit as a prophylactic for preventing development of the infection in predisposed foals. Best results have been reported[21] with treatment begun early in the course of infection and continued 24 to 48 hours after the temperature drops to the normal range and the foal is nursing normally. In newborn foals, an initial dose of 1.0 Gm. of streptomycin followed by 0.5-Gm. doses at three-hour intervals appears adequate for the control of *Shig. equirulis* infections. Streptomycin is now given by many veterinarians as a routine treatment of foals at birth.

Swine Pneumonia.—For certain septicemic infections of swine, streptomycin therapy appears to be indicated. In pneumonia, streptomycin combined with penicillin has been reported of value.

Erysipelas in Pigs.—Erysipelothrix rhusiopathiae, which causes erysipelas in pigs, is susceptible to streptomycin. When streptomycin and penicillin are given together, they seem to have a synergistic action on this organism.[40]

Pasteurellosis in Swine.—Pasteurellosis in swine is caused by *P. multocida.* The disease may occur in two forms, as an infection of the lungs and as an acute septicemic disease. As a primary disease, it occurs sporadically and enzootically. Mortality is variable. In the treatment, streptomycin would seem to have a place.[48]

Atrophic Rhinitis of Pigs.—Streptomycin administered intramuscularly to young suckling pigs is reported to be of value in lowering the incidence of atrophic rhinitis in exposed litters.[35, 43] Injections of 100 mg., given three times during the first month after birth, reduced by a significant degree the incidence of the disease but did not control it completely. The causative agent, the mode and manner of its spread, and other factors require further study before any antibiotic therapy is recommended.

Pasteurella Infections in Sheep.—Pneumonia in which Pasteurella is involved, either as a primary or secondary invader, occurs frequently in sheep. Other Pasteurella infections in sheep are tularemia *(Pasteurella tularensis)* and mastitis *(Pasteurella mastitidis).*[48] Treatment with streptomycin or penicillin has been reported effective against pasteurellosis in sheep.

Other diseases of sheep, such as septicemia of the newborn and septic mastitis and metritis, have been treated successfully with streptomycin in the same manner as in cattle.

GENITAL INFECTIONS

Mastitis.—In most herds of cattle, mastitis is due to a number of pathogens, the infections being occasionally a mixed streptococcic, staphylococcic, and coliform infection.

Streptococcic infections due to *Streptococcus agalactiae, Streptococcus uberis,* and *Streptococcus dysgalactiae* respond well to either 0.1 to 0.5 Gm. of streptomycin together with 100,000 to 300,000 units of penicillin in aqueous solution infused into the affected quarter every 12 hours for one to four doses, or in an ointment base every 12 to 24 hours for one to three days, or in an emulsion with a neutral pH for one to two doses at 48- to 72-hour intervals. Recovery from infections due to the more resistant *Str. uberis* may require larger or more frequent doses. Elimination of 85 to 95 per cent of streptococcic mastitis infections is possible with the treatment suggested.

Staphylococcic mastitis is difficult to treat, probably because of the inaccessability of the organism. Combined streptomycin and penicillin in larger doses and with more frequent and longer treatment than those for the streptococcic infections has been found effective in overcoming this form of the disease. Parenteral therapy, combined with udder infusion, may prove to be of value.

Coliform mastitis has been reported to respond to streptomycin[40]—0.5 to 1.0 Gm. in aqueous solution injected at 12-hour intervals; or 0.25 to 0.5

Gm. in an ointment base injected at 12- to 24-hour intervals, usually combined with penicillin; or 0.5 to 2.0 Gm. in an emulsion with a neutral pH injected at 24-hour intervals. Two to four or more treatments are given until a response is obtained.

Pseudomonas mastitis is reported to be the most difficult to treat. In some studies, cows infected with *Ps. aeruginosa* and other gram-negative, nonlactose-fermenting rods, mostly of paracolon types, responded to treatments with streptomycin, neomycin, and polymyxin mixed in an emulsion vehicle and infused directly into the quarter two or three times at 24-hour intervals.[14]

In chronic mastitis of undetermined etiology, streptomycin combined with penicillin is reported to be the best treatment. If acute mastitis does not respond to one to three treatments with these combined antibiotics in adequate doses, neomycin or polymyxin is indicated, for the infective agent may be Pseudomonas. In severe or gangrenous mastitis with a septicemia, usually due to staphylococcic, coliform, or Pseudomonas infection, parenteral treatment with large doses of combined streptomycin and penicillin is most commonly used. According to some reports, in many acute and chronic cases of mastitis where a specific diagnosis of the infecting organisms is impossible, a combination used to good advantage is 5 Gm. of streptomycin with 1 to 2 million units of aqueous penicillin in 500 ml. of 5 per cent sulfamethazine and 5 per cent sulfamerazine. Two treatments are given at 24-hour intervals.

It has been pointed out that antibiotics used for the treatment of mastitis infections in udders of producing dairy cows have been found in the milk of such cows for several milkings after treatment. This has caused difficulty in the manufacture of various types of cheeses and in the buttermilk from such milk. It has been suggested that dairymen discard at least three milkings after treatment of udders. When the antibiotics are administered by intramammary infusion, thus producing high concentrations in the milk, the milk is not fit for human consumption until at least 72 hours after the last udder infusion.[10]

Mastitis in mares, ewes, and does is treated in the same way as mastitis in cattle. In sows, the treatment usually is parenteral. In 1 case of mastitis in a sow, determined to be due to *A. aerogenes*, intramuscular administration of 2 Gm. of streptomycin every six hours for five days brought about complete recovery.[10]

Other Infections of the Genital System.—Many types of organisms are involved in the infected uterus after calving. Streptomycin has been used successfully in the treatment of retained placenta and metritis. After removal of the placenta, or if the placenta is allowed to slough away naturally, infections can be controlled by injecting 1 Gm. of streptomycin, together with 500,000 units of penicillin, into the uterus. After the uterus has involuted to one-third its gravid size, another dose of the streptomycin and penicillin mixture should be injected. For pyometra, early diagnosis is important. After the uterus is emptied, the intrauterine treatment with streptomycin and penicillin usually brings about prompt recovery.[21]

In septicemia due to an infected uterus in the larger domestic animals, streptomycin and penicillin are frequently administered intramuscularly. In the cow, mare, and ewe, they are sometimes used soon after parturition, when retention of the fetal membranes is evident, to prevent or control possible complications. Acute metritis in swine and in mares often responds to streptomycin and large doses of penicillin along with supportive therapy. In most mares, uterine infections are due to streptococci. Other organisms found in the genital tract are *E. coli*, staphylococci, *Ps. aeruginosa*, and *Corynebacterium equi*. Intramuscular injection of combined streptomycin and penicillin for 14 days has given good results with the streptococcic infection. Staphylococcus and *E. coli* infections also respond to combinations of streptomycin and penicillin. Pseudomonas infections respond best to streptomycin and to chlortetracycline.[21]

Endometritis, cervicitis, and vaginitis in cows have been treated with antibiotics and other local therapy. For clinical endometritis and cervicitis, aqueous solutions or emulsions containing 0.5 to 1.0 Gm. of streptomycin together with penicillin have been injected into both uterine horns. Vaginitis may be treated locally by injecting the same preparation or by applying antibiotic ointments. These treatments have no effect on granular or vesicular vaginitis.

"Repeat-breeder" cows that have regular heat cycles and apparently normal genital tracts but fail to conceive may respond to uterine infusions made in the same way as for clinical endometritis. Some veterinarians, in fact, believe that such cows have subclinical endometritis. It has been reported[21] that, without interfering with pregnancy, antibiotics in sulfonamide solution infused one or two days after service have increased conception rates of cows that are hard to impregnate.

Streptomycin and penicillin solutions also may aid conception when injected into the uterus up to four to six hours before service. One of the most effective solutions for increasing conception rates consists of 1 Gm. of streptomycin and 200,000 to 500,000 units of penicillin dissolved in a 12 per cent sulfapyridine solution.[21] Another, for use in low-grade uterine infections causing infertility, was reported to be 1 Gm. of streptomycin and 1 to 2 million units of penicillin in 40 ml. of sulfonamide solution or sterile water infused into the uterus after expulsion of the corpus luteum and massage of the fallopian tubes.[10]

Though more work needs to be done on antibiotic control of *Vibrio fetus* infections, a few reports indicate that the two most important aids in control today are artificial insemination with streptomycin-treated semen and intrauterine streptomycin treatment of problem cows and heifers.[21, 31] It seems to be universally agreed[1,21,31,32] that widespread increased conception rates have followed

artificial insemination in the last four or five years with the addition of 0.5 to 1.0 mg. of streptomycin alone or combined with penicillin to each milliliter of diluted semen. Whether this improved conception rate is due to control of vibriosis and other infections that might be spread in the semen has not yet been proved. Several workers, however, have reported that vibriosis is apparently controlled by treating possibly infected semen in this manner and diluting the semen at least 25 times and then holding it for 24 hours. If the semen is to be used sooner, it should be allowed to stand at room temperature for four hours. Reports indicate that a minimum concentration of streptomycin required to destroy *V. fetus* in bull semen in less than 24 hours in diluent stored at 5 C. is 2.0 mg./1 ml. and, at 37 C., 0.5 mg./1 ml. The minimum concentration to inhibit growth has been reported as 1.0 μg./1 ml. Streptomycin has been found remarkably stable in thiol medium stored at 37 C. for eight days, whereas other antibiotics tested underwent rapid deterioration.[52]

Some workers prefer combined streptomycin and penicillin for maintaining the sterility of bovine semen. In controlled experiments, 1.0 mg. of streptomycin with 1,000 units of penicillin added to each liter of diluted bull semen was found satisfactory for reducing the bacterial flora. Such treatment of semen from bulls that had a poor conception rate not due to abnormal spermatozoa appeared to influence the rate favorably.[52]

ENTERIC INFECTIONS

A number of enteric infections in large animals have been treated successfully with streptomycin.

Scours in Calves.—In nonruminating calves up to 8 weeks of age, streptomycin in solution has been fed for the treatment and prevention of scours. Individual animals with the disease have also been treated satisfactorily with streptomycin in the feed or placed on the tongue twice daily. A minimal therapeutic dose of 0.25 Gm., given daily for four days, has been found to control acute scours, though some workers believe this dose might need to be increased under certain field conditions.[54] The response in clinically affected animals almost invariably has been prompt, and newborn calves were adequately protected by immediate dosing with streptomycin.[39] For the scour-pneumonia complex in young calves, some workers recommend 0.5 Gm. of streptomycin orally and 0.5 Gm. or more intramuscularly; if necessary, the dosage can be repeated the following day.

In a recent study[55] of the sensitivity to streptomycin of 58 strains of *E. coli* isolated from calves with scours, growth *in vitro* of 52 was completely inhibited by 0.5 to 8.0 μg./1 ml. Four strains were inhibited by 16 μg./1 ml., one by 32 μg., and one strain was completely resistant.

Swine Dysentery.—More work is needed on the treatment of swine dysentery, but reports indicate that the ability of streptomycin to reduce economic losses due to death and stunting appears to justify its use in infected herds.[52] In one study[52] of 2,793 pigs on 11 farms, streptomycin treatment was started after the symptoms were observed. A careful diagnosis was made in each herd, and the herds were followed through to market weight. The streptomycin used was an impure mixture containing 36 to 60 per cent antibiotic and was readily soluble in water. It was most effective when given in the drinking water. The dosage varied from 0.5 to 2.0 Gm. a day for each pig for two days. As a preventive of first or recurrent attacks, the treatment failed. But retreatment was followed by marked improvement in most instances.

Scours and Dysentery of Colts and Lambs.—It has been reported that streptomycin is of value in the individual treatment of colts and lambs affected with scours or dysentery. Enteric infections of foals associated with Shigella, Streptococcus, Salmonella, or coliform organisms respond to streptomycin in doses of 10 to 20 mg./1 kg. of body weight, two or three times daily, sometimes combined with penicillin or chlortetracycline in similar doses intravenously. Such treatments are now commonly employed.

Johne's Disease in Cattle and Sheep.—Conflicting reports have appeared on the effect of streptomycin on *Mycobacterium johnei*, which causes Johne's disease in cattle and sheep. In general, despite the *in vitro* sensitivity to streptomycin of many strains of *M. johnei*, the antibiotic is of no value in the treatment of clinical cases. One recent investigator[56] suggested that those cases were too advanced, and large areas of the intestinal tract had been irreparably damaged before treatment was begun.

OTHER INFECTIOUS DISEASES

Combinations of streptomycin and other antibiotics are used topically under a variety of conditions and in several different forms in the treatment of wounds and wound-infection diseases. Injected parenterally in large doses, they are effective in the control of peritonitis, which is usually traumatic in origin and due to a variety of organisms.

In sinusitis, infected fistulas, infected joints and tendon sheaths, and abscesses, streptomycin in combination with other antibiotics has proved of advantage when used with other therapy. The drugs may be applied in ointment form, in aqueous solution, or in emulsions as often as conditions and response warrant.

Conjunctivitis and Keratitis of Cattle and Sheep.—In conjunctivitis and in infectious keratitis of cattle and sheep, where a mixed and usually undetermined infection is present, antibiotics are commonly applied as an ointment in the eye at three- to 12-hour intervals. Since streptomycin and neomycin and their combinations with polymyxin are stable in water, fresh solutions need not be prepared daily.

Actinomycosis of Cattle.—Actinomycosis, or

"lumpy jaw," has been established as due to *A. bovis*, and both it and actinobacillosis may be considered types of wound-infection diseases. When treatment of actinomycosis in cattle is begun early, streptomycin in 5-Gm. doses, given every 48 hours for five doses, has been successful in arresting the disease process. Some veterinarians recommend dissolving the streptomycin in 50 to 100 ml. of saline or distilled water and injecting it directly into and around the lesions.[64] In one clinical report,[71] 2 Herefords with discharging mandibular lesions were given 4 Gm. of streptomycin intramuscularly three times daily for four days, a total of 48 Gm. each. The lesions healed promptly with no recurrence in two years, though the deformity remained.

Actinobacillosis in Cattle.—Several clinical reports of the treatment of actinobacillosis in cattle have indicated that streptomycin induces prompt recovery. Two Holstein-Friesians with recurrent actinobacillosis, which had been given sodium iodide and local treatments several times in three years, were given 5 Gm. of streptomycin twice daily for five days, a total of 50 Gm. each. There was no recurrence in two years.[71]

Skin and Teat Wounds.—Skin and teat wounds have been successfully treated by either topical applications of streptomycin, alone or in combination with penicillin, or by injection into and around the lesions to arrest infection. In topical applications, solutions or ointments are used. For such conditions as lacerations, polyps, and membranous growths of the teat canal, surgery is generally indicated. In postoperative care of the animals, streptomycin combined with penicillin in an ointment is commonly injected into the teat canal twice daily to help prevent infections.

NEOMYCIN

GENITAL INFECTIONS

Mastitis.—In vitro tests have shown[22,61] that neomycin at levels of 0.01 to 0.155 μg./1 ml. inhibits growth of six of the most common causative microorganisms associated with infectious bovine mastitis—*Str. agalactiae, Str. dysgalactiae, Str. uberis, Micrococcus pyogenes* var. *aureus, E. coli,* and *Ps. aeruginosa.* Many investigators have reported this antibiotic to be an effective and useful treatment for mastitis caused by one or more of these common gram-positive and gram-negative infecting bacteria.[65-71] High percentages of recoveries are on record[9] for chronic and noninfectious cases as well as for acute cases.

The dosage of neomycin usually recommended for treatment of bovine mastitis is 0.5 Gm. in an aqueous or water-miscible base administered directly into each affected quarter. In acute cases, supportive treatment with sulfonamides orally or intravenously and penicillin intramuscularly may be employed with intramammary injections of neomycin. Most chronic cases respond favorably to local treatment alone. When an aqueous solution is infused, neomycin remains in the udder for 72 hours or longer, and a minimum of local irritation has been reported.[22]

A recent evaluation[61] indicates that 0.5 Gm. of neomycin infused into the udder at 24- to 48-hour intervals has not proved so effective against streptococcic and staphylococcic mastitis as has penicillin or combined streptomycin and penicillin.

Neomycin, 0.5-Gm. ointment tubes, and polymyxin in 50.0-mg. doses in aqueous solutions have been used recently in coliform mastitis. Results are variable and require further trials.

Pseudomonas mastitis, the most difficult to treat, has recently responded[14] to direct infusion of the affected quarter with 0.5 Gm. of neomycin and 50.0 mg. of polymyxin or 0.5 Gm. of neomycin in an emulsion or in a 20 per cent sodium iodide solution repeated at 24-hour intervals for two to three doses.[61] Recoveries have been complete in about 40 to 45 per cent of the cases treated. More research is needed with this type of mastitis. Where paracolon types are involved, mixtures of 0.5 Gm. of neomycin, 50.0 mg. of polymyxin, and 0.5 Gm. of streptomycin have proved beneficial.

In chronic mastitis of undetermined etiology, neomycin finds a place in mixtures that are clinically effective against many types of bacteria. If acute mastitis does not respond in one to three treatments with streptomycin and penicillin in adequate doses, then neomycin alone or in combination with polymyxin is indicated, for the infective agent may be a Pseudomonas.

Other Infections of the Genital System.—In cases of metritis, pyometra, and retained placenta, where it is important that the therapeutic agent not be readily destroyed by body fluids, pus, or other exudates, good results have been obtained from placing neomycin powder directly into the uterus.

In the treatment of pyometra and metritis, the neomycin powder is dissolved in water and instilled into the uterus with a syringe and inseminating tube. Estrogens are sometimes used simultaneously to stimulate the expulsion of the uterine contents. The early administration of neomycin powder has proved of definite value in obtaining prompt recovery. Apparently, the rapid bactericidal action of neomycin prevents the development of resistant organisms.[9]

In cases of retained placentas, neomycin powder is sometimes applied in a 1-oz. gelatin capsule, but more often it is carried into the uterus in the palm of the hand. This, for some practitioners, is routine treatment in all cases and neomycin powder is used each time removal of the placenta is attempted.[9]

Infection with *V. fetus* is recognized as a major cause of sterility and abortion in sheep and cattle. *In vitro* tests[80] of the sensitivity of four strains of *V. fetus* to several antibiotics have shown that neomycin is active against the organisms. Both tube-dilution and plate-dilution methods were used. Controlled experiments in known infected cows are needed before specific recommendations can be made.

ENTERIC INFECTIONS

Neomycin has been observed to be effective in controlling enteric infections[10] such as calf scours, calf diarrhea due to *Salmonella dublin*, and baby pig enteritis.

Daily doses of 0.1 to 0.5 Gm. have shown promise in treating scours in calves. In individual cases, the antibiotic can be given in the feed or placed on the tongue twice daily.

An outbreak of *S. dublin*, considered one of the primary causes of calf diarrhea, was recently controlled effectively by oral administration of two 0.5-Gm. neomycin tablets every 12 hours for three days and then one tablet daily until recovery. Of 40 treated calves, 33 recovered completely.[20]

In another group of 20 young calves, a serious outbreak of infectious enteritis believed to have been caused by "Arizona paracolon" organisms was successfully controlled with a 0.5-Gm. tablet of neomycin daily for three days. All treated calves recovered.

In *in vitro* tests on the rumen contents of a fistulated cow on a normal hay and grain ration, neomycin was found to stimulate cellulose digestion. The results were ascribed to changes in microbial populations.

WOUNDS AND WOUND-INFECTION DISEASES

Neomycin, like streptomycin, is used topically for treatment of wounds and wound-infection diseases. It may be applied as an ointment, in aqueous solution, or in emulsion. In the soluble powdered form, it is especially useful and extremely effective as a routine topical application in veterinary practice.[9]

In conjunctivitis and infectious keratitis of cattle and sheep, rapid recovery has been reported after use of neomycin ointment or powder in the eye at three- to 12-hour intervals.

In certain conditions, such as acute sinusitis and joint or tendon sheath infections, parenteral administration of other antibiotics along with local neomycin treatment may produce prompt recovery. Recent introduction of various proteolytic enzyme products has broadened the potentialities of therapy with antibiotics in suppurative conditions. Research is continuing in this rather new field.

Reports have shown that topical applications of neomycin are especially effective in treating superficial wounds of the foot. Possibly the effectiveness is due to ability of the antibiotic to kill both gram-negative and gram-positive organisms. Foot rot lesions are reported to respond well when neomycin powder is applied to the cleaned and trimmed hoof. It has been found convenient to apply the powder abundantly and to dress the foot with gauze bandages which can be removed in 48 hours. The plastic, puffer-type bottle for application of neomycin powder is said to be satisfactory for topical application.

Skin and teat wounds are treated by topical application of neomycin and its combinations with other antibiotics. These wounds are usually treated by antibiotic ointments with or without a bandage. There are few if any reports on the use in large animals of antibiotic ointments in the treatment of skin infections of a bacterial nature, such as staphylococcic dermatitis, but possibly they would be of value. Antibiotics would not be effective in allergic, fungus, or viral skin lesions except to control secondary invaders.

As an adjunct in a great variety of veterinary surgical procedures, such as vaginal[4] and abdominal surgery, cesarean sections in cows, ewes, and sows, neomycin has been found exceptionally useful in controlling infections. Many veterinarians have reported that neomycin powder is more effective than other products used in the past and has materially decreased mortalities. The powder adheres to moist surfaces and is not irritating, and it has broad and rapid bactericidal action.

Small Animal Therapy

STREPTOMYCIN

Streptomycin has found a definite place in the prevention and treatment of infections of small animals. Included are wound infections, infections of the urinary tract, gastrointestinal disorders, respiratory infections, secondary bacterial invaders complicating viral diseases, and preoperative and postoperative therapy.

Many veterinarians regard streptomycin as unquestionably the agent of choice in controlling certain infections of the urinary tract of dogs and cats and, when administered parenterally, it is of value in the therapy of cystitis and nephritis also.

Canine Leptospirosis.—In treating leptospirosis, thought to be one of the most common causes of canine nephritis, combinations of streptomycin and penicillin have been advocated for the leptospiremic phase. The usual recommendation is 0.5 Gm. of streptomycin plus 400,000 units of penicillin injected twice daily, along with supportive therapy. After the infecting spirochete has been localized in the kidneys, the carrier problem becomes dominant, for dogs remain urinary shedders for two to six months after recovery. In these so-called "chronic" cases, 40.0 mg. of streptomycin per kilogram of body weight, injected intramuscularly daily for three to five days, is reported to overcome the infection.[24] It has been suggested[18] that the urine of all dogs intended for breeding should be examined for Leptospira. When infection is found, the animals should be treated with streptomycin then retested before breeding.

Canine and Feline Cystitis.—In canine cystitis due to *E. coli* or Proteus infections, streptomycin also has been found of great value.[18]

Little experimental work has been done in determining the etiology of feline cystitis; information gained has been largely through experiments on rats and other species of animals and how accurate this application may be to feline therapy is questionable. Bacterial infection, however, is known to play a major role. Because of the many

types of microorganisms involved, including gram-negative rods, streptomycin is one of the antibiotics especially indicated.[79] Combinations with sulfonamides may be useful.

Viral Infections in Dogs and Cats.—In viral infections, such as canine distemper and feline panleukopenia, body resistance is lowered and secondary bacterial invaders come in. While treating the primary infection, many veterinarians attempt to fortify their patients against secondary infections by using combined streptomycin and penicillin or streptomycin alone. In such nonspecific, mixed infections in small animals, if the animal shows no definite improvement in 72 hours, continued use of streptomycin will be of no benefit.[26] If pneumonia is present, *Brucella bronchiseptica* may be a factor and may be successfully treated with streptomycin and penicillin administered intramuscularly.[75] In hemorrhagic cystitis following canine distemper, subcutaneous administration of 0.25 Gm. of streptomycin daily in divided doses to 20- to 30-lb. dogs has been effective. For cats, a dose of half that size (10 to 15 mg.) has been suggested.[26]

Respiratory Infections of Dogs and Cats.—Feline pneumonitis which may be caused by a gram-negative rickettsial organism, *Miyagawanella felis*, may be confused clinically with feline panleukopenia.[40] Some workers consider that true feline distemper is caused by the virus *Tarpeia felis*. Some hope has been held out for streptomycin, bacitracin, and chlortetracycline therapy because they are effective *in vitro*. Empyema is common in cats and must be considered a sequel of some purulent respiratory infection, possibly feline pneumonitis. Intrathoracic instillation of streptomycin in daily doses up to 250 mg. or of oxytetracycline in doses of 80 to 120 mg. has been recommended.[66] One cat with empyema recovered after a 20-day course of streptomycin plus oral doses of oxytetracycline (50 mg.) combined with the intrathoracic medication.

Reports indicate that an antibiotic mist produced by nebulizing streptomycin and penicillin in water solution with oxygen is finding favor for treatment of conditions which cause dogs to cough and in which the etiology is obscure. Other experiments have included sulfonamide in aerosols of streptomycin and penicillin for such infections.[63]

Gastrointestinal Disorders of Dogs and Cats.—In diarrhea associated with canine distemper and feline panleukopenia, good response has followed 1 Gm. of streptomycin orally, divided into two or three doses daily.[66]

In canine dysentery associated with gram-negative organisms, such as Proteus and Borrelia,[64] streptomycin has proved effective. For enteritis following panleukopenia in cats, it has also been reported effective. At least three oral doses of 100 mg. each daily for a minimum of three days was recommended. Parenteral administration was less effective but along with oral dosage and supportive therapy, aimed primarily at combating severe dehydration, it was as effective as any other form of treatment.[26]

One clinic reports routine use of streptomycin combined with penicillin for anal gland therapy. After removal of the glandular excretion, the emptied sac is injected with 0.5 ml. of a solution containing 0.25 Gm. of streptomycin and 200,000 units of penicillin per milliliter.

Ocular Infections.—Certain gram-negative ocular infections have been controlled by subconjunctival injections of streptomycin at the rate of 0.5 Gm. in 1 ml. of water.

Prevention of Surgical Infections.—In the prevention of surgical infections, one small animal clinic reports the routine use of streptomycin and penicillin injections for orthopedic procedures requiring a nailing or pin device. In this clinic, a solution containing 250 mg. of streptomycin plus 200,000 units penicillin per milliliter is always injected into the muscles of the affected leg. When the animal has an infection of an extremity without fracture, streptomycin and penicillin are injected as close to the locus of infection as possible.

To control peritonitis due to *E. coli*, streptomycin alone or in combination with penicillin has been used. Administered prophylactically by mouth prior to surgery of the large bowel, streptomycin usually leads to an uneventful postoperative course because of reduction of the bacterial population in the intestines.

Therapy for Furbearing Animals.—There are few reports on antibiotic therapy of furbearing animals. In one outbreak of Shigella infections that caused heavy mortality on a large fox ranch in Ontario, streptomycin and chlortetracycline were found effective, especially when administered in the early stages of the disease. And streptomycin and sulfamethazine in combination reduced the losses from a severe outbreak of Proteus infection on a large fox ranch in eastern Ontario.

Streptomycin therapy for septicemia and orchitis in an adult male ferret in a zoo is reported.[39] After one week of treatment with one of the broad-spectrum antibiotics and supportive subcutaneous and oral therapy, the original symptoms of septicemia were gone but during the last two days of treatment the temperature rose to 105.2 F. and complete anorexia developed, apparently due to acute orchitis. Streptomycin and penicillin were then administered daily for four days, after which a steady recovery was reported. Whether the orchitis was related to the original septicemia was open to speculation.

Laboratory Diagnosis of Rabies.—Streptomycin has proved of value in the laboratory diagnosis of rabies.[49] Intracerebral inoculation of a suspension of infected brain material into white mice will produce typical and constant symptoms in five to 11 days, with consistent production of Negri bodies. Animal brains shipped to diagnostic laboratories, however, are often grossly decomposed on arrival so that it is impossible to inject

mice without danger of introducing complicating bacterial infection. Though a number of suitable agents will kill the contaminating bacteria without affecting the activity of the virus, it is reported that the preferred treatment is with 2 mg. of streptomycin and 500 units of sodium penicillin G per milliliter of tissue emulsion. Brain suspensions so treated are ready for inoculation within 30 minutes as compared with two to 48 hours when other agents are used.

NEOMYCIN

As in the therapy of large animals, so in treating diseases and infections of small animals, neomycin has proved of great value,[37,39] particularly in the form of ointments for topical application to eyes, ears, mouth, nose, and throat; for oral use in enteritis and diarrhea; and as an adjunct in surgery.

Usefulness of the antibiotic in veterinary dermatology and ophthalmology is often reported. Reports indicate prompt relief and complete recovery due to neomycin in cases of canine conjunctivitis. The effectiveness of cortisone and of hydrocortisone with the neomycin in treating disorders of the eye has also been noted.[39]

A number of eye conditions in South American chinchillas, for example, have been treated successfully with a combination of neomycin and cortisone in a suitable base.[39] All cases that responded showed early improvement, with healing in three to 14 days. The eye of the chinchilla appears to have remarkable ability to recover from infection and injury, but certain eye conditions, if untreated or improperly treated, may result in permanent loss of sight in the affected eye or in death of the animal. Keratitis and related conditions are common and often resist treatment with the usual medication. Applications of the neomycin-cortisone combination were made twice daily, and improvement was evident in one to three days in cases responding. Two cases of keratoconjunctivitis and 1 of corneal ulcers healed after failing to respond to prolonged treatment with other agents. Good results were also obtained with corneal opacity, pannus, keratocele, conjunctivitis, and corneal foreign bodies and wounds, several of which had progressed to corneal ulcers. The poorest response was obtained in animals with chronic conjunctivitis that had been under treatment for a time but had not yielded to other medication.

Reports of the effectiveness of neomycin in otitis externa of dogs are fairly common.[37] *Staphylococcus aureus*, strains of streptococci, and gram-negative organisms such as *Ps. aeruginosa* and *E. coli* are frequently involved in cases of persistent otitis externa and otitis media in dogs. Neomycin applied locally is reported[39] to be one of the antibiotics of choice for use where pyocyanic infection is present and of recent occurrence. In the treatment of otitis media, surgery followed by irrigation of the area with streptodornase to which neomycin has been added has given good results.

Some research workers are of the opinion that neomycin is the most effective antibiotic for intestinal antisepsis. It has been reported to be strongly bactericidal against various gram-negative and gram-positive organisms. Because little is absorbed and no appreciable amount is destroyed during passage through the gastroenteric tract, it is most effective in bowel healing.

Poultry Therapy

STREPTOMYCIN

Streptomycin alone or in combination with other therapeutic agents has been found effective in the treatment of a number of diseases of poultry. These include infectious sinusitis of turkeys, diseases due to streptomycin-sensitive organisms that often complicate chronic respiratory disease (CRD) of chickens, *Ery. rhusiopathiae* infections and bluecomb disease of turkeys, Pseudomonas infections of chicks and poults, spirochetosis due to *Borrelia anserina, Salmonella pullorum* infections of baby chicks, and infectious coryza of chickens.

Sinusitis and Chronic Respiratory Disease.—The infectious agents that cause sinusitis in turkeys and CRD of chickens appear to be closely related, if not identical, pleuropneumonia-like organisms. Of 16 antibiotics[74] examined *in ovo* for their chemotherapeutic activity against the agents of these diseases, only those with antirickettsial action appeared to show unmistakable activity against the agent of turkey sinusitis. Streptomycin appeared to be about as active as chlortetracycline.

Some workers have reported that oral streptomycin effectively combats the streptomycin-sensitive organisms that most often complicate CRD. In clinical studies of CRD, treated groups of birds grew much faster and showed better feed conversion and lower mortality than did the controls. In additional tests, entire flocks were treated and, in the majority of them, mortality declined sharply after oral administration of streptomycin. Despite such encouraging results, most investigators emphasize the need for further research on the value of antibiotics in controlling and preventing CRD.

On the other hand, the efficacy of streptomycin in treating infectious sinusitis and air sac infections in turkeys seems to be well established.[59,60] A single dose of 100 to 150 mg. in 1 or 2 ml. of sterile water, injected directly into the swollen sinus, has proved highly effective in reducing mortality from the disease.[64] Recovery rates of 80 to 90 per cent have been reported following the local streptomycin treatment. Intramuscular administration has given good results in some cases.

Erysipelas in Turkeys.—Erysipelas caused by *Ery. rhusiopathiae* has been successfully treated by about 140 mg. of streptomycin in solution injected into the wattles of each turkey.[59] A single dose was found to be 100 per cent effective in preventing death under the conditions of one experiment in

which 80 per cent of the untreated control birds died. Bacteriological examination of birds that survived the treatment, and of 2 that recovered without treatment, revealed that all were free of *Ery. rhusiopathiae* when released 35 to 38 days after treatment started.

Bluecomb in Turkeys.—Though the etiological agent of bluecomb has not yet been determined, the disease, which affects turkeys of all ages, appears to be infectious and can be reproduced in young poults by feeding unfiltered intestinal material. Recent *in vitro* studies[25] have indicated that the agent is susceptible to combined streptomycin and penicillin. Possibly, the antibiotics alter the course of the disease by controlling secondary invaders or by altering the bacterial flora of the intestinal tract. At any rate, 0.5 to 1.0 Gm. of streptomycin per gallon of drinking water reduced the mortality from bluecomb disease in young poults. When given in the feed, streptomycin and other antibiotics had to be used at high levels of 500 Gm. per ton.

Pseudomoniasis and Spirochetosis.—Reports[27] indicate that death losses due to uncomplicated Pseudomonas infections can be prevented by the use of streptomycin-penicillin tissue implants. Injection of one pellet containing 12.5 mg. of streptomycin and 10,000 units of penicillin was found to be 100 per cent effective. When administered in drinking water, 1 Gm. of streptomycin per gallon was 66 per cent effective, whereas 2 Gm. of streptomycin plus 2,000 units of penicillin per gallon was 50 per cent effective.[27]

Spirochetosis due to *Bor. anserina* most commonly causes an acute septicemia in chickens, but is reported also in turkeys, ducks, and geese. In one test of seven antibiotics, including streptomycin, all birds recovered after one or two treatments with adequate doses.

Infectious Coryza.—For infectious coryza of chickens caused by *Hemophilus gallinarum*, streptomycin appears to be the treatment of choice.[5-7] In Israel, for example, where the disease formerly constituted a serious threat to the poultry industry, intramuscular injections of 0.2 Gm. per bird has become the accepted treatment for laying hens, breeding roosters, and growing stock. Adult chickens recovered within three days after a single injection. Moreover, in the laying flocks, about four to ten days after the injection, egg production began to increase markedly and often reached higher levels than before the outbreak of the disease. Use of streptomycin has resulted in a saving of almost half the breeding roosters added to flocks containing coryza carriers.

In growing stock, the streptomycin treatment resulted in recovery from coryza and in quick and active stimulation of appetite, growth, and sexual development. Some shock due to injection of very young and weak birds has been reported.

NEOMYCIN

The literature on neomycin in poultry therapy is still very meager. In one report[42] on the results of neomycin treatment of *Salmonella derby* infection of geese, it was concluded that this antibiotic apparently increased recoveries sufficiently to warrant further study. An outbreak of disease in Toulouse goslings, 8 weeks old, caused a leg weakness and a spraddled condition with a high death rate. An organism of the fowl paratyphoid group, identified as *S. derby*, was isolated from the intestines. Sulfamethazine apparently had no beneficial effect. Neomycin sulfate, by mouth, was then tried, and the death loss in the treated group was reduced to 6.25 per cent, in comparison with 54.5 per cent in the untreated group.

Summary

The introduction of antibiotics in the treatment of numerous diseases of domestic animals and for animal feeding has revolutionized veterinary practice and animal nutrition. Among these antibiotics, streptomycin and neomycin occupy an eminent place.

As a feed supplement, streptomycin has been found safe to use in promoting the growth of young poultry, pigs, certain laboratory animals, and preruminating calves.

Both streptomycin and neomycin have proved effective in the treatment of infections of the genitourinary and intestinal tracts and in wounds and wound infection diseases of large and small animals. And both antibiotics show increasing promise in the treatment of poultry diseases caused by gram-positive and gram-negative bacteria.

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THE NEWS

Dr. Chute, Research Fellow, Author of Article in this Issue

Dr. Harold L. Chute (ONT '49), who in 1953, with the aid of an AVMA Research Fellowship, completed graduate at Ohio State University for which he was awarded the M.Sc. degree, is the senior author of an article "The Pathology of a Fungous Infection Associated with a Caponizing Injury" which appears on page 207 of this issue of the JOURNAL.

Dr. Chute, a native of Winnipeg, received his B.S. degree at the Nova Scotia Agricultural College before enrolling as a veterinary student at the Ontario Veterinary College at Guelph. The subject of his fellowship thesis was "A Pathological Study of Chicken Embryos Infected with Pleuropneumonia-like Organisms from Chickens and Turkeys," a portion of which was published in the *American Journal of Veterinary Research* (Jan., 1954): 108-118. This study was undertaken because of the economic importance and the need for differential diagnosis of chronic respiratory disease in chickens and infectious sinusitis of turkeys. He studied the effects of 13 strains of PPLO on chicken embryos.

Upon completing his fellowship course and receiving his M.Sc. degree, Dr. Chute returned to the Department of Animal Pathology at the University of Maine, at Orono, where he had been a member of the staff since 1949. He is now professor of animal pathology. His duties include teaching, research, and diagnosis with emphasis on poultry diseases. He is also doing research on bovine mastitis and diseases of animal wildlife.

Dr. Harold L. Chute

In addition to seven articles on poultry diseases published before accepting the AVMA Research Fellowship, Dr. Chute has since been the co-author of articles on "Bovine Mastitis. I. Pathogenicity Testing of Micrococci (Staphylococci)," in *Veterinary Medicine* (Oct., 1954: 419-420), and "Acute Lungworm Infestation (Cattle)," in *Veterinary Medicine* (July, 1954: 306-307).

Drs. F. B. Young and E. C. Stone Elected to Executive Board in Districts V and VII

In the election completed on July 12 in District V (Iowa and Minnesota), Dr. Frank B. Young, general practitioner of Waukee, Iowa, was elected to a five-year term beginning at the conclusion of the annual meeting in Minneapolis. He succeeds Dr. C. F. Schlotthauer.

Dr. Frank B. Young

Dr. Young is a graduate of Kansas State College, 1919, and has practiced in Iowa since then. He has been active in state and national veterinary circles for many years and has served as secretary-treasurer of the Iowa Veterinary Medical Association and as editor of its publication, the *Iowa Veterinarian*, since 1949. He joined the AVMA in 1920 and served as chairman of the Special Committee on Veterinary Supply Problems for the past two years.

In District VII (Alaska, Hawaii, Idaho, Montana, North and South Dakota, Oregon, Washington, Philippine Islands, and Wyoming), Dr. Ernest C. Stone, dean of the College of Veterinary Medicine, State College of Washington, Pullman, was elected to a five-year term. Dr. Stone received his veterinary degree from Washington State in 1942 and joined the staff there

in 1946 as associate professor and head of the department of physiology and pharmacology. He was appointed dean in 1952.

Dr. Ernest C. Stone

Dr. Stone succeeds Dr. E. E. Wegner as Executive Board member, the latter having represented District VII for the past ten years.

Association of Equine Practitioners

The first regular meeting of a new organization in the veterinary field, the American Association of Equine Practitioners, was held in Louisville, Ky., March 19, 1955. An account of the meeting and copy of A.A.E.P's constitution and bylaws were sent to members and prospective members in June.

The objectives of the new organization, which will be incorporated as not-for-profit, are to elevate standards of veterinary practice with special reference to horse racing; to promote research in, and knowledge of, equine diseases as aids in improving such practice; to help various agencies concerned with horse racing to improve the methods pertaining to veterinary aspects of racing; to improve relationships with such agencies and with horsemen, and to promote fellowship among the members.

The first officers of A.A.E.P. are Drs. M. L. Scott, Akron, Ohio, president, and J. B. Solomon, Cleveland, Ohio, secretary-treasurer, both of whom had been serving *pro tem*. Dr. W. F. Guard, Columbus, Ohio, and Dr. T. E. Dunkin, Chicago, Ill., were nominated at the Louisville meeting as president-elect and secretary-treasurer elect, respectively.

President Scott has appointed members of several committees: executive, ethics, audit, public relations, and incorporation. A joint A.A.E.P.-AVMA committee was also proposed to study regulatory procedures in equine practice as related to horse racing, and the feasibility and financing of research needed in that field.

Active membership in A.A.E.P. will be open to licensed veterinarians who are graduates of recognized colleges, whose work entails full or part-time equine practice or regulatory work in horse racing, and who are members in good standing of the AVMA or one of its constituent associations.

Associate membership is provided for licensed veterinarians who are interested in the objectives of A.A.E.P. but do not qualify for active status.

The next regular meeting of the association will be held sometime in December, 1955, at a place and time to be announced. Veterinarians interested in joining this association or attending its meetings may write to Dr. J. B. Solomon, secretary-treasurer, 4716 Warrensville Center Rd., Cleveland, Ohio.

Veterinarian Needed for Care of Experimental Animals

The New York State Department of Health is seeking a veterinarian to work with small experimental animals. The starting salary is $5,090 and advances to $6,320 in five annual increases. The civil service examination is open to all qualified citizens of the United States and is scheduled for October 15. The last date for filing applications is Sept. 16, 1955.

Candidates should possess a license to practice in New York State or be eligible to take the licensing examination. They must be graduates of a recognized school of veterinary medicine and have one year of practice, with emphasis on small experimental animals.

Applicants should write to: Recruitment Unit, State Department of Civil Service, Albany, N. Y., for full information on the position.

STUDENT CHAPTER ACTIVITIES

For copy deadline, see "Among the States and Provinces"

Kansas Chapter.—One of the high points of the spring semester for the University of Kansas Student Chapter of the AVMA was moving into the new veterinary hospital. The Dykstra Hospital was in use during the second semester but the formal dedication did not take place until June 2, 1955—the fiftieth anniversary of the School of Veterinary Medicine at the University of Kansas.

During the semester, some of the interesting speakers were **Drs. F. H. Baker** (Ph.D.) of the animal husbandry staff who spoke on stilbestrol; **R. S. Pyles**, state veterinarian from Wichita, the brucellosis control program; **G. O. Sigars**, St. Joseph, Mo.; **L. D. Jernigan**, Council Grove; and **M. D. Rockhold**, Topeka.

The spring dinner dance was held April 20 to honor the 57 graduating seniors.

(Continued on page 278)

News From Washington

Assistant Secretary of Agriculture E. L. Peterson invited five prominent persons to consult with the Department to **review the brucellosis situation and the brucellosis eradication program.** Dean W. A. Hagan, New York State Veterinary College, Cornell University, is chairman of the group. The other members are Dean C. F. Clark, School of Veterinary Medicine, Michigan State University; Mr. W. D. Knox, editor of "Hoard's Dairyman" and member of the National Brucellosis Committee; Mr. Tom Arnold, rancher of Nebraska, also a member of the National Brucellosis Committee; and Dean F. Earl Price of the School of Agriculture, Oregon State College. It is expected the group will hold its first meeting early in September to consult with U.S.D.A. specialists, and later, will confer with livestock groups, state officials, and other interested persons in the country as may be necessary to form a basis for their recommendations to the Secretary.

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Congress provided a supplemental appropriation of **$250.000 for** the Agricultural Research Service to prepare **plans and estimates for animal disease laboratory facilities** which had to be vacated in the main Administrative Building on account of health hazards to the workers, and it is anticipated preliminary plans and specifications will be ready to present to Congress early next year. The U.S.D.A. had requested $500,000.

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The ARS held a **meeting in Denver,** Colo., July 29 and 30, **to discuss rhinotracheitis, mucosal disease, and other related diseases.** Those in attendance were research workers from various universities and laboratories, and also regulatory officials from the immediate vicinity who had been working closely with these diseases. Those present reported on additional developments in research on these diseases since the first meeting, which was held at Purdue University.

HR—7225, **a bill further amending the Social Security Act** was introduced in the House by Mr. Jere Cooper, (D.,Tenn.), chairman, Ways and Means Committee, on July 11, rushed through the House, and passed on July 18 under a suspension of rules. Sent to the Senate, it was referred to the Senate Committee on Finance. The latter committee (Senator Harry F. Byrd (D., Va.), chairman) held a hearing on July 26 to obtain the views of the outgoing Secretary of Health, Education, and Welfare, Mrs. Hobby, who testified against the House-passed amendments, particularly the disability provision. Senator Byrd announced that so many organizations (including the AVMA) had requested an opportunity to testify that public hearings likely would be held early in the second session which begins January, 1956.

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HR—7345, S—2408, S—2484, identical bills introduced early in July, **would create a federal advisory council of health** in the Executive Office of the President, in accordance with the recommendations of the Committee on Organization of the Executive Branch of the Government (Hoover Commission). It would advise and recommend with respect to policies, programs, and operations in medical care and national health.

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S—2587 (Hill, D., Ala.) would authorize the President to give the **Commissioned Corps of the Public Health Service a military status** in time of emergency involving national defense. The present law authorizes such status only in time of war.

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The Third Annual Symposium, sponsored by the Division of Antibiotics, Food and Drug Administration, Department of Health, Education, and Welfare, and the journals, " Antibiotics and Chemotherapy" and "Antibiotic Medicine," will be held in Washington, D.C., November 2-4, 1955, in the main building of H.E.W.

(Continued from page 276)

The officers for the fall semester are: Dave McKnight, president; Bob Asmus, president-elect; George Olson, vice-president; Joe Coyle, secretary; L. D. Kendall, treasurer; Bob Sand, marshall; and Jim Shields, critic.

s/DAVE SCHONEWEIS, *Publicity Chairman.*

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California Chapter.—Plans are underway for the fall program of the University of California Student Chapter of the AVMA. The goal is to have as well-rounded a schedule of activities as was enjoyed in the spring.

The first meeting will be the annual smoker which is a time of introductions of faculty and students. Also scheduled will be the reports of Daniel Smith and Burt Janis who represented the Chapter at the national convention of the AVMA in Minneapolis.

The following officers will preside during the fall semester: Glenn Reck, president; Dale C. Johnson, president-elect; LeRoy Krum, vice-president; Janet Copland-Wentz, secretary; and Horace Warner, treasurer.

s/DALE C. JOHNSON, *Retiring Secretary.*

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Tuskegee Chapter.—During the spring semester, the following officers served the Tuskegee Institute Student Chapter of the AVMA: Ellis M. Hall, president; Raleigh H. Allen, president-elect; Sidney E. Milburn, secretary; and Raleigh H. Allen, treasurer. The following served on the executive board of the Chapter: Ellis M. Hall, chairman; Raleigh H. Allen; Frazier Hemphill; and Kermit Cockrell. The advisor was Dr. G. W. Cooper.

At the February 10 meeting, with 61 members in attendance, a film, "Epidemic Foot-and-Mouth Disease" was shown. At the March 11 meeting, 58 members heard **Mr. Kenneth Jackson,** discuss antiparasympathomimetic drugs, and four films were shown. There were 68 members at the April 14 meeting. The speaker for this evening was **Mr. B. A. Hill,** state extension agent; an educational film was also shown. At the final business meeting on May 12, 63 members in attendance selected Raleigh H. Allen as delegate to the national convention of the AVMA in Minneapolis. **Dr. G. W. Cooper** addressed the group.

The annual banquet was held May 6.

s/ELLIS M. HALL, *President.*

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. Agricultural Research Service are reported as of July 18, 1955.

NEW APPOINTMENTS

Willard J. Ambrose, Spokane, Wash.
Hugh C. Beasley, Raleigh, N. Car.
Clifford L. Belfield, Jr., San Francisco, Calif.
Clair E. Butler, Fort Worth, Texas.
Douglas L. Church, Portland, Ore.
Dale W. Claybaker, Phoenix, Ariz.
Gerald A. Eddy, Lansing, Mich.
Frederick Everhart, Richmond, Va.
Hiram H. Faubion, Portland, Ore.
Charles E. Faulkner, Baltimore, Md.
John D. Fredman, South St. Paul, Minn.
James F. Hallmark, Fort Worth, Texas.
Frazier E. Hemphill, Detroit, Mich.
Jerry J. Hosek, Fort Worth, Texas.
Germain R. Houle, Jacksonville, Fla.
George D. Imes, Jr., Kansas City, Kan.
Wolodymyr Iwankiw, Los Angeles, Calif.
Daniel S. Jaquette, Pearl River, N. Y.
Bohdan Kmicykiewycz, New York, N. Y.
Narciso R. Lapuz, San Francisco, Calif.
Robert J. Lehman, Beltsville, Md.
Michael Lobodiak, Mason City, Iowa.
Jacob L. Miller, Jefferson City, Mo.
Robert H. Morrison, Salt Lake City, Utah.
Dorsey E. Murfree, Bismarck, N. Dak.
Thomas R. Murtishaw, Jr., San Antonio, Texas.
Carl F. Nash, Sioux Falls, S. Dak.
Jaroslaw Ostapiuk, Salt Lake City, Utah.
Melvin U. Pettit, Kansas City, Kan.
Quentin L. Questel, Indianapolis, Ind.
Myron C. Rosenberg, Philadelphia, Pa.
Cameron L. Seger, Lincoln, Neb.
Louis Singleton, San Francisco, Calif.
William R. Strieber, Jefferson City, Mo.
Paul L. Taylor, Milwaukee, Wis.
Philip E. Taylor, Milwaukee, Wis.
Clarence A. Tervola, Los Angeles, Calif.
Willie J. Turner, Fort Worth, Texas.
Robert F. Voss, Columbus, Ohio.
Donald L. Welch, San Francisco, Calif.
Donald L. Williams, Atlanta, Ga.
Albert A. Woodburn, Jacksonville, Fla.
James T. Yoder, Des Moines, Iowa.
William A. Zwiener, St. Paul, Minn.

CANCELLATION of Appointments

Alexander G. M. Bruyns, Reno, Nev.
Lee B. Heutel, St. Louis, Mo.
Charles J. Hymas, Salt Lake City, Utah.
Nevin H. McKay, Jr., Olympia, Wash.
Mervin A. Snell, St. Louis, Mo.

MILITARY FURLOUGH

Melvin U. Pettit, Kansas City, Kan.
Joseph S. Wheatley, Nashville, Tenn.

REDUCTION IN FORCE

William L. Boone, Jr., Nampa, Idaho.

RESIGNATIONS

William F. Alexander, Fort Worth, Texas.
Primitive M. Baluyut, Cincinnati, Ohio.
Charles E. Bea, Sioux Falls, S. Dak.
Thomas L. Branigan, Lincoln, Neb.
William D. Buzard, Kansas City, Kan.
Joseph Caputi, Wichita, Kan.
Stewart S. Elting, Evansville, Ind.
Harry T. Larson, Madison, Wis.
Jay H. Miller, San Francisco, Calif.
James F. Mitchell, San Francisco, Calif.
Walter B. Mowers, Augusta, Maine.
Keith I. Pittman, Los Angeles, Calif.
Walker S. Poston, San Francisco, Calif.
Richard M. Zirkle, Albuquerque, N. M.

RETIREMENTS

Paul C. Denney, Pittsburg, Kan.
Charles H. Horcker, Lake Charles, La.

TRANSFERS

Charles R. Adams, from Knoxville, Tenn., to Lake Charles, La.

Leo F. Barthelme, from Joplin, Mo., to Pittsburg, Kan.

Thomas W. Boman, from Columbia, S. Car., to Little Rock, Ark.

Jesse C. Ellis, Jr., from Raleigh, N. Car., to Nashville, Tenn.

Salem G. Fine, from Oklahoma City, Okla., to Augusta, Maine.

Allie A. Holbrook, from Mexico City, Mex., to Beltsville, Md.

Orello F. Hunter, from St. Louis, Mo., to Nashville, Tenn.

Kenneth W. Irvin, from Omaha, Neb., to Joplin, Mo.

Ries R. Lindley, from Fort Worth, Texas, to Phoenix, Ariz.

Charles A. Mahl, from Chicago, Ill., to San Francisco, Calif.

Robert P. McCoy, Jr., from Nampa, Idaho, to Washington, D. C.

William M. Moulton, from Mexico City, Mex., to Baltimore, Md.

Wendell L. Pinckard, from Nashville, Tenn., to Baltimore, Md.

Warren B. Ross, from Mexico City, Mex., to Fort Worth, Texas.

Willard G. Walter, from Sioux Falls, S. Dak., to East Lansing, Mich.

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U.S.D.A. Tightens Vesicular Exanthema Regulation.—On Jan. 1, 1956, swine fed raw garbage at any time in their life, and products from same, will be unable to move interstate except for special processing. This restores the regulation of July 1, 1953, which was relaxed on Jan. 1, 1954.—*U.S.D.A., July 6, 1955.*

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Field Diagnosticians Complete Foreign Animal Disease Training School.—Twelve veterinarians of the Animal Disease Eradication Branch of U.S.D.A.'s Agricultural Research Service completed, on June 10, a special four-week training school on differential diagnosis of foreign livestock diseases. Disease specialists of the U.S.D.A. and the Public Health Service provided intensified instruction on rinderpest, the vesicular diseases, scrapie, bluetongue, Teschen disease, African swine fever, and other exotic diseases.

This is the third in a series of training courses that have been given over the past three years in Washington and at the Beltsville, Md., Animal Disease Station to provide a defense against outbreaks of dangerous foreign animal diseases within the United States.

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U.S.D.A. Tuberculin Production Ends.—On July 1, all operations in the east wing of the U.S.D.A. Administration Building, involving livestock diseases transmissible to man, were suspended because of hazards to the health of the workers. In the light of modern safeguards, the facilities were inadequate. In the 50 years of research on anthrax, no case had been reported in this laboratory and in over 60 years of research on tuberculosis only one person had been infected as a result of this official work. All tuberculin used during the eradication program had been produced in this laboratory. Arrangements have been made to obtain the supplies from qualified biological supply concerns. Research at Beltsville is not affected.—*U.S.D.A., July 1, 1955.*

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Dr. Taylor Succeeds Dr. Horcher in Louisiana.—Dr. Kenneth E. Taylor (KSC '46) succeeded Dr. Charles H. Horcher as inspector in charge of federal meat inspection at Lake Charles, La., effective August 1.

After receiving his D.V.M. degree, Dr. Taylor engaged in general practice and in federal poultry inspection for a short time before entering the federal meat inspection service. He has been a veterinary meat inspector

Participants in the training program included (left to right): Drs. J. H. Sikes, Jr., Georgia; Mathias J. Kemen, Jr., Vermont; Glen O. Schubert, Minnesota; James M. Fancher, Pennsylvania; Lewis E. Seay, Texas; Herbert Racoff, South Carolina; Robert J. Anderson, chief, Animal Disease Eradication Branch, Washington, D. C.; William L. Wake, Virginia; Norvan L. Meyer, Indiana; Frank Delaplane, Florida; William E. Wiseman, Ohio; Donald W. Johnson, Michigan; and William W. Moulton, Maryland.

in Omaha since 1947 except for two years when he served as captain in the U. S. Army Veterinary Corps.

s/C. H. PALS, *Assistant Chief, Meat Inspection Branch, ARS.*

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative Bylaws.

ANDREEG, DALE E.
Manhattan, Ill.
D.V.M., Ohio State University, 1951.

ANDREWS, WILLIAM
Box 502, Greene, Iowa.
D.V.M., Iowa State College, 1928.

BARR, JOSEPH
5701 Sheriff Rd., N.E., Washington, D. C.
D.V.M., Tuskegee Institute, 1950.

BROMWELL, D. R.
Center Point, Iowa.
D.V.M., Iowa State College, 1949.

BURKE, EDWARD J.
P.O. Box 403, Southport, Conn.
D.V.M., Ontario Veterinary College, 1935.

CHOQUETTE, LAURENT P. E.
Ecole Medecine Veterinaire, St. Hyacinthe, Que.
D.V.M., Ecole du Medecine, St. Hyacinthe, Que., 1939.

CURBELLO, ROBERT E.
Box 968, Texas City, Texas.
D.V.M., Texas A. & M. College, 1954.

DEAL, GLENN P.
Box 221, Wilkesboro, N. Car.
D.V.M., Alabama Polytechnic Institute, 1948.

GRAHAM, WALTER R.
The Upjohn Company, Pharmacology Dept., Kalamazoo, Mich.
D.V.M., Colorado A. & M. College, 1950.

HACECKY, ROBIN M.
1012 W. 9th, Yankton, S. Dak.
D.V.M., Iowa State College, 1950.

HEARN, HARVEY B.
53 Stevens St., Camilla, Ga.
D.V.M., University of Georgia, 1952.

HENDERSON, FORREST E.
Vallarata No. 1, 901-A, Mexico, D. F., Mex.
D.V.M., Alabama Polytechnic Institute, 1943.

JOHNSON, KLEMENS F.
Box 339, South Omaha Station, Omaha, Neb.
D.V.M., Washington State College, 1938.

MARTIN, R. S.
7228 Canal St., Houston, Texas.
D.V.M., Texas A. & M. College, 1937.

MULHERN, FRANCIS J.
2702 Oakwood St., Falls Church, Va.
D.V.M., Alabama Polytechnic Institute, 1945.

NEWHAVEN, EDWARD W.
P.O. Box 7, Chillicothe, Ill.
D.V.M., McKillip Veterinary College, 1918.

PETERSON, WESLEY P.
26 N. 1st E., American Fork, Utah.
D.V.M., Colorado A. & M. College, 1950.

SHARMAN, ROBERT S.
502 Vernon St., La Grange, Ga.
D.V.M., Alabama Polytechnic Institute, 1945.

SPEAR, MAYNARD L.
Room 26, Curtiss Hall, Iowa State College, Ames, Iowa.
D.V.M., Iowa State College, 1931.

TATE, HIRAM L.
1012 E. LaSalle Ave., South Bend, Ind.
D.V.M., Ohio State University, 1911.

TRAINER, P. E.
314 E. Walnut St., Goldsboro, N. Car.
M.R.C.V.S., Royal (Dick) Veterinary College, 1954.

VEZEY, STANLEY A.
3207 Edgar, Maplewood, Mo.
D.V.M., Texas A. & M. College, 1944.

SYLSTRA, ANTHONY W.
c/o Biological Research Institute, Box 551, San Diego, Calif.
D.V.M., Cornell University, 1941.

WALKER, WILLIAM K.
513 1st Ave., E., Jerome, Idaho.
D.V.M., Colorado A. & M. College, 1932.

WILSON, EDWARD J.
3409 Fairview Rd., Baltimore, Md.
D.V.M., Ohio State University, 1940.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

CURSACK, HORACIO A.
Moreno 2001, Esperanza, Prov. de Santa Fe, Argentina.
D.V.M., National University of Buenos Aires, 1954.
Vouchers: M. A. Emmerson and I. A. Merchant.

LOPEZ-SECO, JORGE A.,
Trelles, 1040, Buenos Aires, Argentina.
V.S., National University of Buenos Aires, 1950.
Vouchers: B. D. Blood and B. Szyfres.

LORENTZEN, KAY W.
U.S. Army Dispensary, 8350th AU., APO 949, Seattle, Wash.
V.M.D., University of Pennsylvania, 1947.
Vouchers: R. B. Morgan and J. C. McIntyre.

TOPACIO, TEODULO M., JR.
T-163 B, Area 2, University of the Philippines, Quezon City, Philippines.
D.V.M., University of the Philippines, 1951.
Vouchers: A. C. Gonzaga and J. B. Aranez.

ZAMBRAMO, ALVARO L.
Calle 40, #7-39 Bogota, Colombia, S. A.
D.V.M., National University of Colombia, 1953.
Vouchers: G. Maldonado M., and D. Pacheco-Perez.

Second Listing

ARSHADI, MORTEZA G., c/o Edareh Colle Dampezeshki, Takhte Djamshid Ave., Teheran, Iran.
CASE, JIM H., JR., Box 536, Fort Huachuca, Ariz.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

First Listing

University of California

VANCE, DOUGLAS J., D.V.M.
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Vouchers: J. N. Henry and W. S. Bentham.

Colorado A. & M. College

BARTLETT, ROBERT E., D.V.M.
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BRYANT, ROBERT E., D.V.M.
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Vouchers: O. R. Adams and M. M. Benjamin.

MASTERSON, KENNETH G., D.V.M.
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Vouchers: O. R. Adams and M. M. Benjamin.

Iowa State College

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Vouchers: B. W. Kingrey and F. K. Ramsey.

BELHA, JERRY P., D.V.M.
Manlius, Ill.
Vouchers: D. L. Baker and H. W. Reuber.

BROWN, WAYNE W., D.V.M.
R.R. 3, Agronomy Farm, Ames, Iowa.
Vouchers: I. A. Merchant and L. M. Jones.

CARMICHAEL, RICHARD A., D.V.M.
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Carroll Veterinary Clinic, Carroll, Iowa.
Vouchers: B. W. Kingrey and O. W. Whitcomb.

CONLEY, JOHN R., D.V.M.
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Vouchers: E. C. Jensen and B. W. Kingrey.

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Vouchers: I. A. Merchant and C. H. Covault.

CRAWLEY, JOHN E., D.V.M.
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Vouchers: M. W. Sloss and E. C. Jensen.

CREEL, JAMES A., D.V.M.
Cherokee, Iowa.
Vouchers: B. W. Kingrey and M. J. Johnson.

DOCKSTADER, WALTER E., D.V.M.
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Vouchers: W. S. Monlux and O. W. Whitcomb.

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400 Sharpe St., Essexville, Mich.
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10651 W. Ten Mile Rd., Oak Park, Mich.
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105 E. Third St., Washington, Iowa.
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128 Church, Highland Park, Mich.
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5335 Tuohy Ave., Skokie, Ill.
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GODKIN, GORDON F., D.V.M., Innisfail, Alta.
HENRY, JAMES N. R., D.V.M., 81 Grove Ave., Ottawa, Ont.
HORNING, RONALD SCOTT, D.V.M., 2901 Lafayette Rd., Indianapolis, Ind.
JARVIS, RICHARD E., D.V.M., 84 Poplar Plains Crescent, Toronto, Ont.
JONAS, ALBERT M., D.V.M., 399 Whalley Ave., New Haven, Conn.
JULIA, THEODORE R., D.V.M., Waterville, Maine.
KARSTAD, LARS H., D.V.M., Qualicum Beach, B.C.
LEEDHAM, STEWARD G., D.V.M., c/o Dr. William J. Gay, 691 Lake Ave., Woodstock, Ill.
LESTER, FRANK N., D.V.M., 62 Lindsay St., S., Lindsay, Ont.
LINGARD, DONALD R., D.V.M., 505 14th St., S., Lethbridge, Alta.
MCILWAIN, ROBERT D., D.V.M., 452 Wyandotte St., W., Windsor, Ont.
MACQUARRIE, GEORGE K., D.V.M., 10756 101st St., Edmonton, Alta.
MARTIN, HOWARD G., D.V.M., 429 Herkimer St., Hamilton, Ont.
MINIATS, OLGERTS P., D.V.M., c/o Dr. A. F. Bishop, High River, Alta.
MORRISON, AUDREY E., D.V.M., 68 Greensides Ave., Toronto, Ont.
NORTH, RONALD G., D.V.M., 563 Blue Hills Ave., Hartford, Conn.
OLIVER, WILLIAM R., D.V.M., Swan River, Man.
PALLISTER, WILLIAM A., D.V.M., Russell, Ont.
PAYNE, DONALD D., D.V.M., 420 Woodford St., Portland, Maine.
PRIDHAM, THOMAS J., D.V.M., Box 214, c/o Dr. G. A. Shiedel, St. Mary's, Ont.
REED, JOHN H., D.V.M., R.R. 4, Brampton, Ont.
REES, HUMPHREY G., D.V.M., 14 Corrymore, Sketty, Swansea, Wales, Great Britain.
RING, CARLETON B., D.V.M., 84 Main St., Richmond, Maine.
SAMMONS, RAY M., JR., D.V.M., R.D. 2, Townsend, Del.
SHERMAN, HAROLD R., D.V.M., c/o Dr. J. A. Elliott, 286 Forest Ave., Bangor, Maine.
SMITH, ELMER K., D.V.M., Ovando, Mont.
STANGER, NORMAN E., D.V.M., 149 Hindley Ave., St. Vital, Winnipeg, Man.

STULA, EDWIN F., D.V.M., West Road, Colchester, Conn.
VERONI, FRANK, D.V.M., 177 Wellington Blvd., Guelph, Ont.
WATSON, BRUCE G., D.V.M., R.R. 4, Brampton, Ont.
WILLIAMS, LYNN H., D.V.M., 67 Collingwood St., Kingston, Ont.
WILSON, MERLIN E., D.V.M., 109 Dundas St., E., Belleville, Ont.
ZAILOKAL, G. V., D.V.M., 68 Baker St., Guelph, Ont.

Texas A. & M. College

DARTER, DAVID A., D.V.M., Star Route A, Box 30, Austin, Texas.
FOWLER, RAYMOND O., D.V.M., Rocking T Ranch, Van Horn, Texas.
MOORE, RICHARD W., D.V.M., Box 515, College Station, Texas.
PESSIN, ARNOLD G., D.V.M., Box 1505, College Station, Texas.
ROWE, EUGENE T., D.V.M., 3700 Moss Side Ave., Richmond, Va.
SIMS, FRANK N., D.V.M., Loop 12 Animal Hospital, Dallas, Texas.
TURNER, PERCY R., D.V.M., Box 457, Water Valley, Texas.
WATTS, GENE L., D.V.M., 618 S. Denton St., Gainesville, Texas.

Tuskegee Institute

MCCOTTRY, ALLISON P., D.V.M., P. O. Box 60, Orangeburg, S. Car.
SINGLETON, LOUIS M., D.V.M., Box 538, Tuskegee Institute, Ala.
TAYLOR, PAUL L., D.V.M., 314 E. Fourth St., Frankfort, Ky.
WILSON, DONALD, D.V.M., 5938 S. Elizabeth St., Chicago, Ill.

AMONG THE STATES AND PROVINCES

The deadline for news copy is the 24th of the month, two months preceding the month of issue

Alabama

Civil Defense Meeting for Veterinarians.—The monthly meeting of the Central Alabama Veterinary Medical Association was held June 2, 1955, in the Officers' Club at Maxwell Air Force Base, Montgomery. The meeting was unusual in that the main subject discussed was civil defense. Enough interest was aroused on this subject to have the meeting televised over a local station. Lieutenant Colonel Hummer, the association's president, introduced the theme by explaining how a veterinarian will be utilized in a civil defense disaster plan. Lieutenant Colonel N. G. MacEachern, program chairman for June, presented the guest speakers. **Dr. Frank A. Todd,** Washington, D. C., advisor to Agriculture Research Service, U.S.D.A., and consultant to the Federal Civil Defense Administration on Veterinary Services, spoke on foreign and exotic diseases of animals which could be introduced into the United States, either accidentally or through espionage activity, **Major U. S. Grant Kuhn, III,** U.S.A.F. (V.C.) with the Agriculture Research Service, University of Tennessee, and the Atomic Energy Commission, gave an illustrated talk showing the effects of livestock radiation. **Dr. M. M. Van Sandt,** regional medical director for civil defense, explained how a veterinarian will be used in a large scale enemy attack. Some of the administrative problems now being encountered in our civil defense program were also discussed by Dr. Van Sandt.

Because of the subject and its relation to the medical field, physicians and dentists from the Montgomery area attended as guests of the members. Approximately 55 physicians, dentists, and veterinarians attended. After the meeting, a number of guests congratulated the association on its foresight in fostering better understanding between the allied medical fields.

Arizona

Central Association.—The regular meeting of the Central Arizona Veterinary Medical Association was held in the Desert Inn in Phoenix, July 12, with Dr. J. T. Dungan of Glendale as host.

Mr. John Langstein gave an informative talk on south africa and its problems.

In the business meeting, **Dr. E. R. Hinshaw** of Glendale and **Dr. G. S. Calderwood** of Tempe enlightened the group on recent interpretations of the state regulations pertaining to dispensing and selling drugs. Dr. W. E. Merritt of Phoenix suggested the group give some thought to considering Phoenix as a site in a few years for the annual AVMA meeting.

s/KEITH T. MADDY, *Secretary.*

California

San Diego County Association.—At its June 28 meeting, the San Diego County Veterinary Medical Association conducted its annual election of officers. Dr. L. O. Foelschow, Palm City, was elected president; Dr. E. R. Quortrup, San Diego, vice-president; and Dr. H. R. Rossoll, San Diego, secretary-treasurer.

The Association has 47 active members who meet the fourth Tuesday of each month.

s/E. R. QUORTRUP, *Retiring Secretary.*

District of Columbia

Poultry Pathologists Meet.—Poultry pathologists of 11 states and the U.S.D.A. met in Washington, D. C., May 12-13 to review cooperative research on air sac infection. Future research will investigate: (1) the possibility of recognizing and eliminating infected birds from

breeder flocks; (2) drugs and other methods for controlling the disease; and (3) reservoirs and methods of transmitting the infection.

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District Association.—The District of Columbia Veterinary Medical Association will hold an all-day meeting on October 11 at the Armed Forces Institute of Pathology at the Walter Reed Medical Center. The meeting will be followed by a cocktail party, dinner, and dance.

This is the first time the Association has attempted a full-day program of clinical and scientific papers.

s/CHARLES G. DURBIN, *Secretary.*

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Death of Colonel Jimison.—Lieutenant Colonel Robert Loomis Jimison (OSU '38), V.C., U. S. Army, 41, commanding officer, veterinary food inspection, Army Service Unit 2002-07, Fort Meade, Md., was killed instantly in an automobile collision on July 16, near Denton, Del. He was interred in Arlington National Cemetery July 21 with chapel services and military honors.

Colonel Jimison had been on assignment in the Second Army a week when the accident occurred while he was driving to his home. Mrs. Catherine (*née* Pharion) Jimison, his widow, was taken to Walter Reed Army Hospital for treatment and recuperation from injuries received at the same time. Surviving also are a 1-year-old son and four daughters from 2 to 13 years of age.

A native of Bowling Green, Ohio, Colonel Jimison was commissioned as a first lieutenant in the Army Veterinary Corps reserve in June, 1938, immediately following graduation.

He served as post veterinarian at Fort Niagara, N. Y., for five years, in Europe for three years, and was stationed in Chicago for veterinary food inspection until September, 1952, when he was assigned to Fort MacArthur, Calif., as station and area veterinarian.

Colonel Jimison joined the AVMA in 1938.

Georgia

State Association.—The Georgia Veterinary Medical Association held its forty-ninth annual meeting at the Atlanta Biltmore Hotel in Atlanta on May 29-31, 1955, with 150 veterinarians, wives, and guests in attendance.

The out-of-state guest speakers were: **Drs. John G. Hardenbergh,** executive secretary of the AVMA.; **H. C. Smith,** president of the Iowa State Association; **J. E. Greene,** School of Veterinary Medicine, Auburn, Ala.; **John Durr,** graduate student, Auburn, Ala.; **C. K. Mingle,** assistant chief of staff, ARS, Washington, D. C.; and **Donald J. Dean,** New York State Health Department, Albany.

Other speakers were: **Drs. C. L. Bromley, E. E. Chambers, J. R. Clanton, T. B. Clower, C. F. Davis, Frank A. Hayes, Chas. P. Hill, J. L. Hopping, R. A. Houston, C. B. King, W. D. Martin, Jr., J. H. Sharman, Shirley Shepard, J. W. Thome,** and **C. C. VonGremp,** all Georgia veterinarians.

Dr. R. O. Barnes, swine practitioner of Claxton, was chosen as Georgia veterinarian of the year, and presented a certificate of award by Dr. John G. Hardenbergh at the annual luncheon.

Officers elected for 1955-1956 were: president, Dr. Shirley Shepard, Moultrie; president-elect, Dr. C. C. VonGremp, Decatur; secretary-treasurer, Dr. Chas. C. Rife, Atlanta.

The next annual meeting will be in Savannah.

s/CHAS. C. RIFE, *Secretary.*

Illinois

Dr. Pickard to Head Diagnostic Laboratory.—Dr. J. R. Pickard (KSC '45), for the past five years general manager of Livestock Conservation, Inc., Chicago, has accepted a position as supervisor of the diagnostic laboratory operated at Urbana by the Illinois Department of Agriculture in cooperation with the College of Veterinary Medicine of the University of Illinois. Dr. Pickard takes up his new duties August 15.

Prior to his work directing the national livestock prevention program of Livestock Conservation, Inc., he practiced for five years in southern Illinois.

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Death of Mrs. N. S. Mayo.—Mrs. Mary C. Mayo, 88, Highland Park, wife of Dr. Nelson S. Mayo, retired former veterinary director of Abbott Laboratories and one-time secretary of the American Veterinary Medical Association, died on July 5, 1955. Dr. and Mrs. Mayo, who were classmates at Michigan State College, would have celebrated their sixty-fifth wedding anniversary on July 30. Mrs. Mayo was a charter member of the Women's Auxiliary to the AVMA.

Mrs. Mayo also leaves two daughters, Mrs. Mary Louise Freytag and Mrs. Marguerite (Ashe) Lockhart; a son, Robert S.; and six grandchildren.

Indiana

Wabash Valley Association.—The Wabash Valley Veterinary Medical Association met for a social gathering at the Colonial Hotel on a lake near Rochester during June. Dinner, boating, and cards were enjoyed.

s/J. L. KIXMILLER, *Resident Secretary.*

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Northwestern Association.—Members of the Northwestern Indiana Veterinary Medical Association enjoyed a dinner meeting in the Morris Bryan Hotel, LaFayette, in June. The veterinarians and their wives heard **Professor F. E. Shaw** describe his trip to Beirut, Lebanon. This trip was to re-establish forest lands in

that country. Professor Shaw illustrated his talk with interesting slides.

s/J. L. KIXMILLER, *Resident Secretary.*

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Northeastern Association.—The Northeastern Indiana Veterinary Medical Association met in the Paradise Hotel, Hamilton Lake, on June 12, to enjoy a fine chicken dinner, shuffle board, horse shoes, and other games.

s/J. L. KIXMILLER, *Resident Secretary.*

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Death of Mrs. Shockley.—Mrs. O. C. Shockley, the wife of Dr. O. C. Shockley of New Ross, died suddenly on June 23, 1955.

s/J. L. KIXMILLER, *Resident Secretary.*

Iowa

Dr. Fowler Retires.—Dr. George R. Fowler (WSC '25) retired as head of the Department of Surgery and Medicine, Division of Veterinary Medicine, Iowa State College, in July. Dr. Fowler came to the school in 1928 and was named head of the Department of Surgery in 1932. He has served as faculty advisor to the publication, *Iowa State College Veterinarian,* since its inception in 1938. He will continue on the staff as professor of surgery.

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Dr. Covault Honored.—Dr. C. H. Covault (OSU '11) was recently awarded a faculty citation by the Iowa State College Alumni Association for "long, outstanding, and inspirational service on the college staff." Dr. Covault joined the staff in 1917 and in addition to his outstanding teaching did a remarkable job as counselor for the veterinary students. He retired as head of the Department of Medicine and director of clinics, Division of Veterinary Medicine, in 1951, but remains on the teaching faculty.

Dr. C. H. Covault

Cedar Valley Association Officers.—The newly elected officers of the Cedar Valley Veterinary Medical Association are: Drs. E. L. Koch, Plainfield, president; R. A. Benson, Dunkerton, vice-president; and D. A. Buchanan, Grundy Center, secretary-treasurer. This Association meets the second Monday of each month except July, August, October, and January at Black's Tea Room in Waterloo.

s/D. A. BUCHANAN, *Secretary.*

Kentucky

State Association.—The forty-fourth annual meeting of the Kentucky Veterinary Medical Association was held at the Seelbach Hotel in Louisville on July 20-21, 1955, with 200 in attendance.

The program listed the following speakers and their subjects: **Drs. L. L. Breeck,** state veterinarian, Frankfort, and **F. L. Mulhern,** ARS, Washington, D. C., brucellosis program; **Joe Knappenberger,** Ashe Lockhart, Inc., Kansas City, Mo., cattle practice; **A. H. Quin,** Kansas City, Mo., president of the AVMA, AVMA activities, and transmissible diseases of cattle; **W. F. Irwin,** president, A.A.H.A., Tulsa, Okla., chest surgery; **J. D. Ray,** Affiliated Laboratories, White Hall, Ill., biological products; **C. M. Stowe,** University of Minnesota, St. Paul, equine restraint; **William McGee,** Lexington, equine practice; **John R. Dick,** Fort Dodge Laboratories, Fort Dodge, Iowa, hog cholera control; and **Charles Holler,** Madisonville, cattle practice.

Mr. Samuel R. Guard, former teacher at the Chicago Veterinary College and now editor of Breeder's Gazette, and the Hon. Ben S. Adams, commissioner of agriculture, were voted honorary members of the Association.

The new officers of the Association are Drs. Wayne Boyd, Hodgenville, president; John Miller, Clinton, president-elect; H. A. Gray, Bowling Green, vice-president; and Robert Singer, Lexington, secretary-treasurer.

s/T. J. STEARNS, *Resident Secretary.*

Maine

State Association.—The summer meeting of the Maine Veterinary Medical Association was held July 13 at Holly Inn, Christmas Cove.

The following speakers addressed the group: **Drs. F. Langdon Davis,** Augusta, on civil defense; **Stanford Merrill,** Augusta, current legislation; **C. A. Manthei,** Beltsville, Md., leptospirosis; and reports were made by the state and federal veterinarians.

At a social gathering in the evening, members enjoyed a lobster dinner.

s/J. F. WITTER, *Secretary.*

Maryland

State Association.—The summer meeting of the Maryland State Veterinary Medical Asso-

ciation was held at the Hotel George Washington in Ocean City on June 23-24, 1955.

The following speakers presented papers at the scientific session: **Drs. David Bartlett,** American Breeder Service, Chicago, artificial insemination; **Frank Kral,** University of Pennsylvania, Philadelphia, dermatomycosis in small and large animals; **Roland Gessart,** University of Maryland, ketosis therapy; **H. M. DeVolt,** Livestock Sanitary Service Laboratory, College Park, poultry diseases; **Robert W. Kirk,** New York State Veterinary College, Ithaca, femoral head prothesis; **C. Irvin Frock,** Reisterstown, soundness in the horse; **Robert W. Kirk,** New York State Veterinary College, Ithaca, fluid therapy in kidney diseases; **R. P. Link,** University of Illinois, Urbana, metritis in cattle; **E. E. Ruebush,** Silver Springs, radiographs of small animals.

The new officers of the Association are: Drs. Irvin W. Frock, Reisterstown, president; Harold E. Schaden, Frederick, first vice-president; Thomas Ladson, Jr., Olney, second vice-president; and John D. Gadd, Cockeysville, secretary-treasurer. The following comprise the board of directors: Drs. A. L. Breuckner, College Park; Donald Lynch, Frederick; Robert Flahery, Easton; Charles Ziegler, Baltimore; John Carroll Fowble, Timonium; and L. J. Poelma, Hyattsville.

s/JOHN D. GADD, *Resident Secretary.*

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Death of Dr. Clyde Everson.—Dr. Clyde LoRayne Everson, professor of veterinary science, University of Maryland, University Park, died suddenly of a heart attack at the Prince Georges General Hospital, on July 6, 1955, at the age of 49.

Born in Crawfordsville, Ind., Nov. 22, 1906, Dr. Everson was a resident of Maryland since his appointment to the University in the Live Stock Sanitary Service, State Board of Agriculture. He was graduated in 1929 from the College of Veterinary Medicine, Ohio State University.

He was a member of the American Veterinary Medical Association and the Maryland Veterinary Medical Association of which he was president in 1949-1950. He was a member of the Darlington, Ind., Masonic Lodge No. 186, F. & A.M., and member of the Omega Tau Sigma fraternity, Ohio State chapter.

Surviving are his widow, the former Emma Marie Dominek of Cleveland, Ohio, whom he married in 1929; a son, Richard (4) and daughter, Nancy (9); and his sister Mrs. Homer B. Ward of Crawfordsville, Ind.

Dr. Clyde L. Everson

Michigan

State Association Officers.—The officers of the Michigan State Veterinary Medical Association are: Drs. Peter J. Babich, Flint, president; Kenneth H. Fraser, Niles, president-elect; Stephen Kelly, Detroit, first vice-president; Charles Coy, Hillsdale, second vice-president; William Mackie, Lapeer, third vice-president; and Paul V. Howard, Grand Rapids, secretary-treasurer.

s/PAUL V. HOWARD, *Secretary.*

Minnesota

Dr. H. C. H. Kernkamp (right), Dean W. T. S. Thorp, and Charles Kucirek (left), president of the AVMA student chapter, are shown after the Veterinarian's Oath was taken, June 1, 1955, by the seniors graduating in veterinary medicine at the University of Minnesota.

Dean Thorp spoke briefly concerning the purpose of the oath and Dr. Kernkamp administered the oath.

Mississippi

State Association.—The forty-ninth annual meeting of the Mississippi Veterinary Medical Association was held in the Buena Vista Hotel in Biloxi on July 10-12, 1955.

The following guest speakers addressed the group: **Drs. E. E. Chambers,** Rossville, Ga.; **C. H. Clark,** Alabama Polytechnic Institute, Auburn; **B. F. Hoerlein,** Alabama Polytechnic Institute, Auburn; **Clay Lyle** (Ph.D.), dean,

School of Agriculture, and director, Agricultural Experiment Station and Agricultural Extension Service, Mississippi State College; **T. S. Steenerson**, Wilkinson, Ind.; **Asa Winters**, assistant to the chief of the Animal Disease Eradication Branch of the Agricultural Service, Washington, D. C.

Member speakers included the following: **Drs. Ben Huston**, Laurel; **A. J. Joyner**, Biloxi; **Glenn Gates**, Clarksdale; **John Randle**, West Point, president of the state Association; **Joe Tillery**, Jackson; **C. A. Allen**, Greenville; **J. C. Mullins**, Clarksdale; **J. V. Duckforth**, Meridian; **R. E. Arline**, Greenwood; **L. J. Pate**, Jackson; **S. A. Cox**, Jackson; **Wm. L. Gates**, Clarksdale; **Jack B. Ross**, Jackson; **C. L. Odom**, Laurel; **B. T. Simms, Jr.**, Pontotoc; **Bob Mayo**, Forest; **C. H. Horne**, Newton.

During the business session, the following officers were elected: Drs. C. H. Horne, Newton, president; G. B. Bradshaw, Macon, president-elect; W. H. Lindley, Vicksburg, vice-president; H. F. McCrory, State College, secretary-treasurer.

s/H. F. McCRORY, *Secretary.*

Missouri

Death of Dr. John L. Wells.—Dr. John Lyle Wells, 63, veterinary director of Haver-Glover Laboratories, Kansas City, widely known and honored veterinarian who had been active in professional affairs for many years, died on July 20, 1955, following a stroke suffered a few days earlier.

Born at Paris, Texas, in 1892, Dr. Wells attended public schools there and in Missouri before entering Kansas City Veterinary College from which he received his D.V.M. degree in 1915. He entered the Army Veterinary Corps in World War I as a lieutenant and was discharged as a major in 1919, after seeing service at stations in this country and going through the Meuse-Argonne offensive with the 80th Division, A.E.F.

After practicing for 16 years, he became sales manager and editor at the Haver-Glover laboratories, having served in that capacity for 17 years at the time of his death. Prior to his general practice, he served five years in animal disease control work in Missouri.

Dr. John L. Wells

Dr. Wells was the first president of the Southwest Missouri Veterinary Medical Association and had been president of the Missouri and Kansas City associations. He was secretary-treasurer of the state Association for 15 years and for eight years was its delegate to the AVMA House of Representatives.

He served two terms as mayor of Blue Springs in the 1940's and had been a member of the city council, school board, and planning board. He was also active in the Methodist church and boy scout work.

In February of this year, Dr. Wells was named "Veterinarian of the Year" by the Missouri V.M.A., the first so honored. He joined the AVMA in 1931, was a member and chairman (1945-1946) of the Committee on Therapeutic Agents from 1945 to 1950.

Surviving are his widow, Mrs. Kathryn Jester Wells, of Blue Springs; a daughter, Mrs. James B. Bartholomees, Arlington, Va.; a son, John L. Wells, Jr., Mankato, Minn.; his mother, Mrs. J. G. Wells, Washington; two sisters, four brothers, and three grandchildren.

Interment was in Blue Springs cemetery following services at the Methodist church on July 22.

Montana

State Association.—The forty-fifth annual meeting of the Montana Veterinary Medical Association was held June 15-17, 1955, at Great Falls.

The program included the following speakers and their topics: **Drs. A. H. Quin**, Kansas City, Mo., president of the AVMA, AVMA activities and mucosal disease; **H. G. Stoenner**, Rocky Mountain Laboratory, Hamilton, leptospirosis; **Richard L. Ott**, Washington State College, Pullman, canine virus diseases; **C. L. Heath**, Billings, large animal diseases; **E. A. Tunnicliff**, head, Montana Veterinary Research Laboratory and Department of Veterinary Science, Montana State College, Bozeman, research problems; **H. Ross**, Kalispell, small animal diseases; and **J. D. Wheat**, University of California, Davis, diseases and hereditary defects of large animals.

Dr. Quin added a great deal to the program and gave a wonderfully impressive talk at the banquet on the numerous activities of special benefit to the younger members of the profession and also to the wives.

The newly elected officers are: Drs. R. D. Read, Ronan, president; A. F. Hayes, Billings, vice-president; and G. A. Morrison, Great Falls, secretary-treasurer. In addition to these officers, the executive board consists of Drs. J. D. C.

Those attending the first refresher course on bovine infertility were (left to right), Drs. Yasgur, Batchelder, Widger, Lukens, Hoppenstedt Turner, Fales, Fincher, Francis, Cleveland, Thomson, Haller, Berdan, Roberts, Fox, Megale, Oberst, Danks, Hoag, Palmer, Wainwright, Hirschey, Fuller, Forsyth, Woelffer, Sweatman.

Wipf, Bozeman; A. E. McChesney Bozeman; H. L. Nordell, Great Falls; and E. A. Tunnicliff, Bozeman. Dr. Tunnicliff had served as secretary of the Association for eighteen years.

s/E. A. TUNNICLIFF, *Retiring Secretary.*

New York

Refresher Courses.—A refresher course in bovine infertility at the New York State Veterinary College, Ithaca, was limited to 20 veterinary practitioners in New York State; as it drew 40 applicants, the course was repeated. The first was held on June 13 to 17, the second on June 26 to 30. Guest instructors for the first course were Drs. Fayne Oberst of Kansas State College and Elmer Woelffer of Oconomowoc, Wis.; for the second course, Drs. A. V. Bartenslager of the University of Pennsylvania and J. A. Henderson of Ontario Veterinary College. Dr. H. K. Fuller of Interlaken, N. Y., and Professor Francisco Megale of the

Those attending the second refresher course on bovine infertility were (left to right), Drs. Holmes, Hughes, Bentinck-Smith, Smith, Megale, Gilman, Davidson, Watt, Tierney, Burch, Jones, Mick, Fortune, Ferris, Danks, Fincher, Liebig, Henderson, Tabor, Hagan, Wallace, Roberts, Bartenslager, Thomas, McEntee, VanDeusen, Fox, Skyer, Chambers, Phillips, Ward, Jackson.

Veterinary College, Horizonte, Minas, Gerais, Brazil, who has been doing graduate work at the school, as well as 12 members of the veterinary faculty and four professors from the College of Agriculture, served as instructors for both courses.

About 50 cows and 15 bulls, representing various stages of pregnancy and a variety of pathological conditions, were collected as clinical material. The morning sessions were devoted to lectures and demonstrations, including electroejaculation, artificial insemination, pudendal nerve block, treatment of trichomoniasis, and cesarean section by both flank and ventral techniques. Afternoons were devoted to clinical practices and the evenings to discussions, with question-and-answer sessions.

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New Veterinary Degree.—A new degree, Doctor of Science in Veterinary Medicine, has been established at Cornell University. The D.Sc. in V.M. is a professional degree for advanced study in clinical practices. The degree for advanced study in basic sciences such as pathology will continue to be Ph.D.

North Carolina

Dr. J. Howard Brown Honored.—At the annual meeting of the North Carolina State Veterinary Medical Association, Dr. J. Howard Brown of Tarboro was named veterinarian of

Dr. J. Howard Brown

the year. Dr. W. D. Collins, Winston-Salem, president of the state Association, presented Dr. Brown with a plaque, and a banquet was held in his honor. Dr. Brown, who served as mayor of Rich Square from 1921 to 1923, has resided in Tarboro since 1933. He has served as president of the state Association and was its secretary for 19 years. He is co-author of the book "A Veterinary History of North Carolina."

s/CLYDE W. YOUNG, *Resident Secretary.*

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State Association.—The fifty-fourth annual meeting of the North Carolina Veterinary Medical Association was held at the Hotel Kitty at Wrightsville Beach on June 21-22, 1955.

The following speakers addressed the scientific session: **Drs. R. P. Knowles,** Miami, Fla., problems of small animal practice; **G. R. Moore,** Michigan State College, East Lansing, sterility in dairy cows; **A. M. Mills,** University of Georgia, Athens, beef cattle practice; **D. C. Beard,** Concord, cortisone in small animal practice; **J. W. Peace,** High Point, diseases of the eyes of small animals; **J. E. Reed,** Gastonia, diseases of the mouth of small animals; and **D. E. Hightower,** Jefferson, diseases of sheep.

s/CLYDE W. YOUNG, *Resident Secretary.*

Oklahoma

Dr. Orr Honored.—Dr. Harry W. Orr, dean of the School of Veterinary Medicine of Oklahoma A. & M. College, received one of six Chicago Merit Awards for 1955 from the Iowa State College Club of Chicago in "recognition of pre-eminent service advancing human welfare." The awards were presented at the Iowa State College Alumni Day, June 11. Dr. Orr received his D.V.M. degree at Iowa State College in 1918 and his M.A. in 1919. Since then he has been on the faculty at Oklahoma A. & M. College where, until he became dean in 1953, he served as head of the Department of Veterinary Physiology. One of his favorite activities for many years has been working with the Boy Scouts of America.

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Dr. Whitehair to Visit Foreign Veterinary Colleges.—Dr. C. K. Whitehair (KSC '40) professor of physiology and animal husbandry at Oklahoma A. & M., attended the International Biochemical Congress at Brussels, Belgium, August 1 to 6. He will spend several months visiting schools of nutrition and veterinary colleges in the British Isles and on the Continent before returning.

Ontario

Orlan Hall, Assistant Veterinary Director General Retires.—Dr. Orlan Hall, assistant veterinary director general, has retired after 43 years with the Department of Agriculture.

At a gathering in his honor last July, Dr. J. G. Taggart, deputy minister, spoke of Dr. Hall's long and meritorious service and presented him with a certificate from the Minister of Agriculture expressing the thanks of his Department.

As a mark of esteem from his many colleagues and friends, Dr. Hall received a television set and Mrs. Hall was the recipient of

a bouquet of roses. Many telegrams from veterinary authorities in this and other countries were read, wishing Dr. and Mrs. Hall a happy and well-earned retirement.

Dr. Hall graduated from the Ontario Veterinary College in 1910 and joined the Health of Animals Division, Ottawa, in 1912. During his long career, he held many important positions and for some considerable time supervised the plans to stamp out tuberculosis among Canadian cattle—a plan which over the years has had a great effect in reducing the incidence of this disease in man.

An expert on the regulations between countries to safeguard the health of livestock—as well as entirely Canadian regulations—Dr. Hall's time in recent years has been increasingly concerned with these international arrangements. He has represented the Department at many international conferences in the United States and Europe and has been associated with the work of FAO and other organizations in improving the breeding and health of livestock throughout the world.

Dr. Hall is secretary-treasurer of the Canadian Veterinary Medical Association, is active in the work of the Ontario and other veterinary associations in Canada, and now expects to devote more time to these affairs. He has been an AVMA member for 42 years.

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Dr. Schofield Honored at Retirement Dinner.—On the evening of June 17, 1955, more than 300 friends of Dr. Frank W. Schofield, noted veterinary pathologist, investigator, and teacher at Ontario Veterinary College for 40 years, gathered in Creelman Hall to pay tribute to him on the eve of his retirement which he announced would take place on September 1 of this year.

Many distinguished friends and leaders in agriculture and veterinary medicine from the Dominion, Ontario province, and the States were present, including the Hon. F. S. Thomas, Minister of Agriculture; C. D. Graham, deputy minister; Dr. K. F. Wells, veterinary director general of Canada; Dr. T. Lloyd Jones, principal, Ontario Veterinary College; Dr. J. D. MacLachlan, principal, Ontario Agricultural College, Dr. Margaret McReady, principal, MacDonald Institute; Rev. W. A. Young, padre, Ontario Agricultural College, Henry Hosking, MP; Dr. L. M. Hutchings, Purdue University, and a number of their ladies.

Many messages of good will were read from former students, leaders in research and education, and friends from all over North America. AVMA President A. H. Quin wrote, "the public builds few statues and rarely accords fitting recognition to self-effacing Schofields and other brilliant scientists of our time. But, as members of the veterinary profession, we can wholeheartedly thank this much-loved colleague for his devotion to duty, his many contributions to the advancement of knowledge, his inspiration to his students over the years, and his humanitarian interest in all mankind."

Representing the AVMA as a member of the

Dr. Schofield (left) receiving gift presented by the Hon. F. S. Thomas, Minister of Agriculture for Ontario, on behalf of the doctor's many friends at a retirement dinner on June 17.

Executive Board, Dr. Hutchings spoke of the important role played by Dr. Schofield and other Canadian veterinarians in veterinary science, the former's research in sweet clover poisoning, and the recognition that went with Dr. Schofield's receipt of the Twelfth International Veterinary Congress Prize in 1954 in which he was cited for contributions to veterinary medicine and as "a Christian gentleman and a great teacher."

Dr. Schofield was presented with a leather wallet containing a check for $900, contributed voluntarily by his friends. In responding to the many tributes, he reviewed his years of service at O.V.C., the interlude spent in Korea as a teacher at a mission school in Seoul, and said he planned to return to Korea following his retirement, to continue his work among the needy.

Oregon

Northwest Association.—The annual meeting of the Northwest Veterinary Medical Association was held July 25-27 at the Multnomah Hotel in Portland.

The speakers were **Drs. R. L. Ott**, Washington State College, Pullman, on canine virus

diseases and geriatrics; **E. M. Baldwin**, Corn States Serum Co., Omaha, Neb., enterotoxemia complex of cattle and sheep; **Mr. Creighton Merrell**, Merrell Aviation Ground School Boeing Field, Seattle, Wash., modern aviation and the veterinarian; **Drs. E. M. Dickinson**, Oregon State College, Corvallis, erysipelas control in turkeys; **W. D. Persson** and **J. A. Folinsbee**, Vancouver, B. C., surgical techniques for small animals; **D. R. Mason**, Nyssa, practice problems; **P. L. Stovell**, Vancouver, B. C., vibriosis; **Mr. R. W. Bucklin**, Aluminum Co. of America, public relations; **Drs. R. R. Williams**, Caldwell, Idaho, bovine infectious rhinitis; **Arne S. Jensen, Jr.** (M.D.), **Wm. R. Endicott, Jr.** (M.D.), **R. A. Martin** (M.D.), and **R. D. Reid**, Albany, demonstration of surgical treatment of cardiac arrest; **C. D. Van Houweling**, Livestock Regulatory Programs, Agricultural Research Service, U.S.D.A., progress in fight against livestock diseases; **E. L. Nundal**, Langley Prairie, B.C., fluorine poisoning from insecticides; **D. L. Moyer**, Portland, chest surgery; and **K. J. Peterson**, state veterinarian, anaplasmosis.

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Death of Dr. Sanders.—Oral M. Sanders (TEX '43), 47, Ocean Lake, Ore., died at Lincoln Beach, Ore., on June 4, 1955, of a coronary attack.

After graduation, Dr. Sanders returned to his home state of Oklahoma, where he established a large and small animal practice at Ada, which he conducted until his health failed two years ago, forcing him to retire. He joined the AVMA in 1944.

Dr. Sanders is survived by his widow, Oma M., and a son, Glen M. Sanders, who has just returned from a tour of Army duty on Okinawa.

Wisconsin

Short Course on Swine Diseases.—A short course on swine diseases was held June 29-July 1 on the campus of the University of Wisconsin. The enrollment was limited to 28 Wisconsin practitioners because of the limited facilities.

Virtually all members of the staff of the Department of Veterinary Science participated in the short course, as well as the following guest speakers: **Drs. J. R. Pickard**, Livestock Conservation, Inc., Chicago; **Roy Ormand**, Oscar Mayer and Co., Madison; **J. P. Torrey**, hog cholera station, U.S.D.A., Ames, Iowa; **H. J. O'Connell**, **A. F. Krone**, **R. E. Hall**, and **E. P. Pope**, Wisconsin State Department of Agriculture, Madison; **Gustav Bohstedt**, **Fred Giesler**, and **H. L. Self**, Department of Animal Husbandry, University of Wisconsin; **Wm. G. Hoekstra**, Department of Biochemistry; **A. B. Chapman**, Department of Genetics of the University; and **Lee T. Railsback**, Ellsworth, Minn., who presented papers on swine erysipelas, dystocia in sows, hog cholera vaccination, and enteric diseases of swine. Other subjects discussed were: hog cholera research, liver and kidney defects of newborn pigs, heritable diseases of swine, parakeratosis, brucellosis, atrophic rhinitis, leptospirosis, toxic diseases, and internal and external parasite control.

s/C. W. BURCH, *Extension Veterinarian.*

VETERINARY MILITARY SERVICE

Public Health Degrees Awarded Officers.—Seven career Air Force veterinary officers were awarded the degree of Master of Public Health in June, 1955. They are: from the University of California, Lt. Col. William E. Bills (OSU '36), and Capt. Robert A. Crandall (MSC '49); from Tulane University, Major Frederick W. Clayton (OSU '44); from the University of Michigan, Major Robert W. Bailey (MSC '43); from Harvard University, Capt. Gene C. Phelps (ISC '46); from Johns Hopkins University, Capt. William H. Watson, Jr. (GA '50); and from the University of North Carolina, Capt. Robert J. Young (TEX '50).

Lieutenant Colonel Bills and Captain Young were elected to membership in the honorary public health fraternity, Delta Omega. Major Clayton was elected president of his class and his thesis was granted the top award.

• • •

Major Bridenstine Returns from Korea.—Major William A. Bridenstine, who helped develop the "freeze-drying" process of vaccine production in Korea, returned to the United States in July. As principal advisor to the ROK government officials on livestock disease control, breeding, and farm education, he was instrumental in introducing modern methods of animal husbandry which resulted in substantial increase in the livestock population.

Major Bridenstine was succeeded as principal veterinary and livestock advisor to the ROK livestock officials by Major William D. McMonagle.

• • •

Colonel Rust Addressed Group in England.—Colonel John H. Rust, U. S. Army veterinary officer presently assigned to research duty at the University of Chicago, addressed the two-day course for Agricultural Reconnaisance Officers at Harwell, England, on the problem of fallout and fission metabolism in large domestic animals. On the second day, Colonel Rust spoke on the pathological physiology of total body irradiation in large domestic animals.

The Atomic Research Establishment at Harwell, England, near Oxford University is conducted by the United Kingdom Atomic Energy Authority and will soon have a research building, now under construction, specifically for the study of fallout in agriculture.

The ninetieth class of veterinary officers completed (July 8, 1955) the course at the Army Medical Service Meat and Dairy Hygiene School in Chicago. The class visited AVMA headquarters and heard talks on the work of the Association.

Back row (left to right): First Lieutenants Richard F. Coleman**; Herbert M. Utgard; Hugo J. Nykamp; Kenneth C. Loper**; William L. Downey; Harold L. Strandberg; Captain Abdulla Illeri, Turkey; Major Reshad Ak, Turkey; First Lieutenants Donald O. Manthei**; Albert W. Franzmann, U.S.A.F; Richard W. Stewart; and Roy H. Kay.

Third row—First Lieutenants James G. Fish, Jr; John A. Stetson**; Robert L. Craig*; John D. Coltrain*; Philip D. Plocher; Conrad S. Steiner**; Jesse G. Tippins, U.S.A.F; Robert H. Stine; William D. Barber, U.S.A.F.; Charles W. Brown**; Joseph A. Braden; and Robert W. Glotfelty.**

Second row—First Lieutenants Robert J. Warne**; James A. Gourlay; Stanley R. Spesard; James C. Branch, Jr; Howard H. Jones, Jr; Robert Alexander**; Lawrence W. Gearhart**; Henry B. Lyons**; Roy P. Goldston, U.S.A.F; James Robbin; Charles E. Herren; Milton L. Green, U.S.A.F; and James R. Howard.

Front row—Captain John A. Postle, adjutant; Captain Harrison S. Martin, instructor; Lt. Col. Wayne D. Shipley, director; Col. Philip R. Carter, commandant; Major Edward P. Hornickel, instructor; Major James B. Young, instructor; and Captain John S. Zwiers, instructor.

*Graduated on July 15, 1955;** graduated on July 22, 1955.
Major Ak, graduate of the Turkish Military Veterinary Faculty, Ankara, in 1937, will return to his assignment in Turkey. Captain Illeri, Ankara, 1945, will continue his training in the United States.

BIRTHS

Dr. (COR '43) and Mrs. Merrill Goodman, Washingtonville, N. Y., announce the birth of a daughter, Marsha, on March 22, 1955. Marsha joins brothers, Mark 7 and William 5.

Dr. (WSC '36) and Mrs. Fleetwood R. Koutz, Columbus, Ohio, announce the birth of their fourth child, a daughter, Norma Jean, on April 30, 1955.

Dr. (MSC '52) and Mrs. Winston S. Carpenter, Lincoln, Mich., announce the birth of a daughter, Susan Lee, on June 12, 1955.

Dr. (MO '54) and Mrs. Harry J. Forrest, Clinton, Iowa, announce the birth of a son, John Wallace, on July 17, 1955.

DEATHS

★**Simon W. Alford** (KCV '10), 69, Lincoln, Neb., died May 14, 1955. Dr. Alford practiced in Medford and Fremont, Neb., and in 1914 was appointed director of the hog cholera serum laboratory in Lincoln, Neb. In 1938, he was transferred to the Nebraska Agricultural Extension Service and during World War II served in the Veterinary Corps of the U. S. Army. He was released from the Army in 1946, having attained the rank of colonel. Dr. Alford was a member of the U. S. Livestock Sanitary Association, the Nebraska Veterinary Medical Association, and of the AVMA for 40 years.

Joseph S. Bennett (KCV '11), Independence, Mo., died Dec. 6, 1954. Dr. Bennett is survived by his widow and a daughter.

Farra L. Botkin (ONT '92), 87, Muncie, Ind., died May 31, 1955. Dr. Botkin was prominent in civic activities in Muncie for a number of years. He is survived by his widow.

Jesse C. Bowman (KCV '04), Excelsior Springs, Mo., died Dec. 31, 1954. Dr. Bowman was a general practitioner. He is survived by his widow.

Thomas S. Burke (ONT '18), 67, Windsor, Ont., died March 1, 1955. Dr. Burke is survived by his widow.

Daniel J. Crouch, 95, State Line, Ind., died May 15, 1955. He was graduated from the veterinary college at London, Ont., and practiced

50 years before his retirement in 1935. Survivors include four sons, five grandchildren and five great grandchildren. His wife, four sons and one daughter preceded him in death.

★**Clyde L. Everson** (OSU '39), 49, College Park, Md., died July 6, 1955. Dr. Everson was a member of the AVMA. An obituary appears on page 293 of this JOURNAL.

★**James J. Flaherty** (UP '12), 72, North Haven, Conn., died June 16, 1955. Dr. Flaherty was a member of the Connecticut Veterinary Medical Association and of the AVMA. His widow and two sisters survive him.

Joseph M. Flannery (COR '18), Bainbridge, N. Y., died March 9, 1955. Dr. Flannery was acting superintendent of the Cincinnatus plant of the Borden Dry Milk plant. He is survived by his widow.

Charles H. Grange (CVC '10), Longmont, Colo., died May 21, 1955. Dr. Grange was a general practitioner.

★**Emory I. Gregory** (COR '11), 65, Whitney Point, N. Y., died March 13, 1955. Dr. Gregory had practiced in Broome County since 1911. He was a director of the Whitney bank, a past master of the local Masonic Lodge, a member of the Grange, and of the AVMA. He is survived by his widow and a stepson.

Edward D. Hudson (USC '17), Gettysburg, Pa., died May 11, 1955. Dr. Hudson, a general pracitioner, had also served with the U. S. Bureau of Animal Industry.

★**Michael J. Hughes** (COR '20), 60, Toms River, N. J., died June 22, 1955. Dr. Hughes served in the Veterinary Corps of the U. S. Army. He was a member of New York State Veterinary Medical Association and of the AVMA. His widow survives him.

Henry T. Jarrett (UP '03), 87, Philadelphia, Pa., died May 31, 1955. Dr. Jarrett had served as a judge at dog shows for many years.

★**Robert L. Jimison** (OSU '38), 40, Fort Meade, Md., died in an automobile collision on July 16, 1955. An obituary appears on page 291 of this JOURNAL.

★**Sperry C. Kinton** (UP '36), 42, Lebanon, N. J., died of a heart attack on May 29, 1955. Dr. Kinton was active in civic and professional affairs. He is survived by his widow and two young sons. Dr. Kinton was admitted to the AVMA in 1937.

★**Willis H. Meadors** (KCV '00), 81, Birmingham, Ala., died on July 19, 1955. Dr. Meadors was a retired BAI inspector. He joined the AVMA in 1904 and was made an Honor Roll (50 year) member last year.

Clarence H. Nye (MCK '15), 65, Cambridge, Ill., died Feb. 8, 1955. Dr. Nye was a member of the Illinois State Veterinary Medical Association and had been a member of the AVMA.

Herman J. Nygren (ISC '10), 74, Waverly, Iowa, died March 30, 1955. Dr. Nygren retired from practice in 1950.

Emmet J. Packer (KCV '18), Kansas City, Mo., died recently. Dr. Packer had worked in the Kansas City stockyards.

Merl C. Park (MCK '08), Mooresville, Ind., died in 1954. Dr. Park had retired from practice. He is survived by his widow.

★**Robert M. Platt** (KSC '10), 69, Protection, Kan., died May 22, 1955. Dr. Platt was a general practitioner and also ran a ranch. He was a member of the AVMA.

Clarence S. Renshaw (CVC '11), 67, Huntington Park, Calif., died May 28, 1955. Dr. Renshaw was a meat inspector for the federal meat inspection service.

★**Uric B. Reynolds** (WVC '02), 74, Fort Branch, Ind., died June 15, 1955. Dr. Reynolds was a general practitioner. He was admitted to the AVMA in 1942.

James E. Rice, Miami, Fla., an honorary member of the AVMA, died Oct. 25, 1953. He is survived by his widow.

Henry Richards (ONT '07), Indian Head, Sask., died June 25, 1954. Dr. Richards had served three terms as president of the Saskatchewan Veterinary Medical Association and had been a member of the AVMA.

★**Oral M. Sanders** (TEX '43), 47, Ocean Lake, Ore., died June 4, 1955. Dr. Sanders was a member of the AVMA. An obituary appears on page 298 of this JOURNAL.

F. F. Sheets (ONT '09), Van Wert, Ohio, died recently. Dr. Sheets, who had spent most of his professional life in Van Wert, was also known as a trainer of show horses.

Sumner S. Smiley (ONT '01), Drayton, Ont., died in December of 1953. Dr. Smiley was a general practitioner.

Maynard E. Smith (KCV '16), 67, Elmore, Minn., died Feb. 17, 1955. Dr. Smith had been a member of the AVMA.

Ora L. Spidell (ONT '05), Wilmot, Ohio, died in March of 1954. Dr. Spidell was a general practitioner but had retired some years prior to his death.

James F. A. Thomas (KCV '17), 70, Oswego, Kan., died March 29, 1955. Dr. Thomas, a general practitioner, had been a member of the AVMA. He is survived by his widow, a daughter, and a grandson.

Bruce M. Wallace (ONT '11), 73, Byron, N. Y., died Jan. 2, 1955. Dr. Wallace, a general practitioner, had been in ill health for several years. He is survived by his widow.

W. S. Wilson (TH '14), Buffalo, Minn., died late in September of 1954. Dr. Wilson had retired from practice several years ago.

Edward L. Young (KCV '12), 69, Grandview, Mo., died May 1, 1955. Dr. Young had practiced at Grandview for nearly 40 years prior to his retirement five years ago. He is survived by his widow, two sons, and five grandchildren.

★ Indicates members of the AVMA.

COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

New Mexico Veterinary Medical Association. Annual meeting. Hilton Hotel, Albuquerque, N. M., Sept. 12-13, 1955. Charles Webster, 711 N. Quincy St., Roswell, N. M., secretary.

Canadian Veterinary Medical Association. Annual meeting. Bessborough Hotel, Saskatoon, Sask., Sept. 12-15, 1955. Claude Kealey, 1195 Wellington St., Ottawa 3, Ont., secretary.

Northeast Mississippi Veterinary Medical Association. Annual meeting. Stroup Animal Clinic, Corinth, Miss., Tuesday, Sept. 13, 1955. James H. Nelson, Baldwyn, Miss., secretary.

New York State Veterinary Medical Society. Annual meeting. Hotel Statler, New York, N. Y., Sept. 14-16, 1955. Joan S. Halat, 803 Varick St., Utica, N. Y., acting executive secretary.

Colorado Veterinary Medical Association. Annual meeting. Steamboat Springs, Colo., Sept. 16-18, 1955. Walter R. Haas, Eaton, Colo., secretary.

Washington State Veterinary Medical Association. Annual meeting. Hotel Leopold, Bellingham, Wash., Sept. 23-24, 1955. R. E. Ebright, 2836 W. Maplewood St., Bellingham, Wash., general chairman.

Oklahoma A. & M. College. Conference for veterinarians. School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, Okla., Sept. 29-30, 1955. J. D. Friend, Department of Veterinary Anatomy, chairman.

New England Veterinary Medical Association. Annual meeting. Poland Spring House, Poland Spring, Maine, Oct. 2-5, 1955. Russell N. Abbott, Rockland, Maine, publicity chairman.

Missouri, University of. Annual short course. School of Veterinary Medicine, University of Missouri, Oct. 3-4, 1955. Cecil Elder, chairman, Veterinary Short Course Committee.

International Association of Milk and Food Sanitarians. Annual meeting. Hotel Bon-Air, Augusta, Ga., Oct. 4-6, 1955. Howard Wilkowske, Gainesville, Fla., secretary.

Purdue University. Annual short course for veterinarians. Purdue University, Lafayette, Ind., Oct. 5-7, 1955. L. M. Hutchings, head, Department of Veterinary Medicine.

District of Columbia Veterinary Medical Association. All-day meeting. Armed Forces Institute of Pathology, Walter Reed Medical Center, Washington, D. C., Oct. 11, 1955. Charles G. Durbin, 5705 Berwyn Rd., Berwyn Heights, College Park, Md., secretary.

South Dakota Veterinary Medical Association. Annual meeting. Cataract Hotel, Sioux Falls, S. Dak., Oct. 12-13, 1955. J. L. Noordsy, Marion, S. Dak., secretary.

Eastern Iowa Veterinary Medical Association, Inc. Annual meeting. Hotel Montrose, Cedar Rapids, Iowa, Oct. 13-14, 1955. Wayne H. Thompson, Earlville, Iowa, secretary.

Illinois, University of. Annual short course for veterinarians. School of Veterinary Medicine, University of Illinois, Urbana, Ill., Oct. 13-14, 1955. L. E. Boley, chairman, Veterinary Conference Committee.

Southern Veterinary Medical Association and Florida Veterinary Medical Association. Joint annual meeting. George Washington Hotel, Jacksonville, Fla., Oct. 16-19, 1955. A. A. Husman, 320 Agricultural Bldg., Raleigh, N. Car., secretary, Southern Association.

Interstate Veterinary Medical Association. Annual meeting. Martin Hotel, Sioux City, Iowa, Nov. 1-2, 1955. K. W. Smith, 510 W. 19th St., Sioux City, Iowa, secretary.

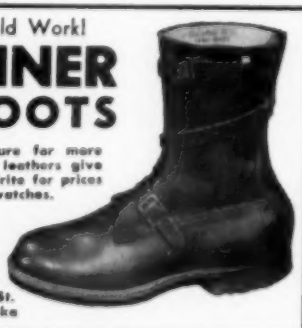
Association of Military Surgeons of the United States, Annual convention. Hotel Statler, Washington, D. C., Nov. 7-9, 1955. Address Secretary, Suite 718, New Medical Bldg., 1726 Eye St., N. W., Washington 6, D. C.

Midwest Small Animal Hospital Association and regional A.A.H.A. Joint meeting. Hotel Burlington, Burlington, Iowa, Nov. 9-10, 1955. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

U. S. Livestock Sanitary Association. Annual meeting. Jung Hotel, New Orleans, La., Nov. 16-18, 1955. R. A. Hendershott, 1 W. State St., Trenton 8, N. J., secretary.

Animal Care Panel. Annual meeting. Henry Hudson Hotel, 353 W. 57th St., New York, N. Y., Dec. 1-2, 1955. Robert J. Flynn, P.O. Box 299, Lemont, Ill., secretary.

(Continued on p. 26)



(COMING MEETINGS—continued from p. 24)

Regularly Scheduled Meetings

Atlanta (Ga.) Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. D. A. Buchanan, Grundy Center, Iowa, secretary.

Central Alabama Veterinary Association, the first Thursday of each month. G. J. Phelps, Jr., Montgomery, Ala., secretary.

Central Arizona Veterinary Medical Association, the second Tuesday of each month. F. R. Benton, 302 South Country Club Dr., Mesa, Ariz., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Wilfred Pimentel, 3455 S. Elm Ave., Fresno, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro, N. Car. R. T. Copeland, 1800 Walker Ave., Greensboro, N. Car., secretary.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. Charles J. York, P. O. Box 1656, Indianapolis 6, Ind., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., La-Grange, Ill., secretary.

Coastal Bend (Texas) Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

(Continued on p. 28)

(COMING MEETINGS—*continued from p. 26*)

East Bay (Calif.) Veterinary Medical Association, bimonthly, the fourth Wednesday. John T. Turver, 1201 E. 12th St., Oakland 6, Calif., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. R. P. Link, College of Veterinary Medicine, University of Illinois, Urbana, Ill., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. John D. Baker, Goldsboro, N. Car., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Greater St. Louis (Mo.) Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Luther E. Fredrickson, Room 25, Municipal Courts Bldg., St. Louis, Mo., secretary.

Jacksonville (Fla.) Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. L. D. Barrett, Rt. 8, Box 572, Jacksonville, Fla., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. Dr. W. E. Bewley, P.O. Box "H", Crestwood, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

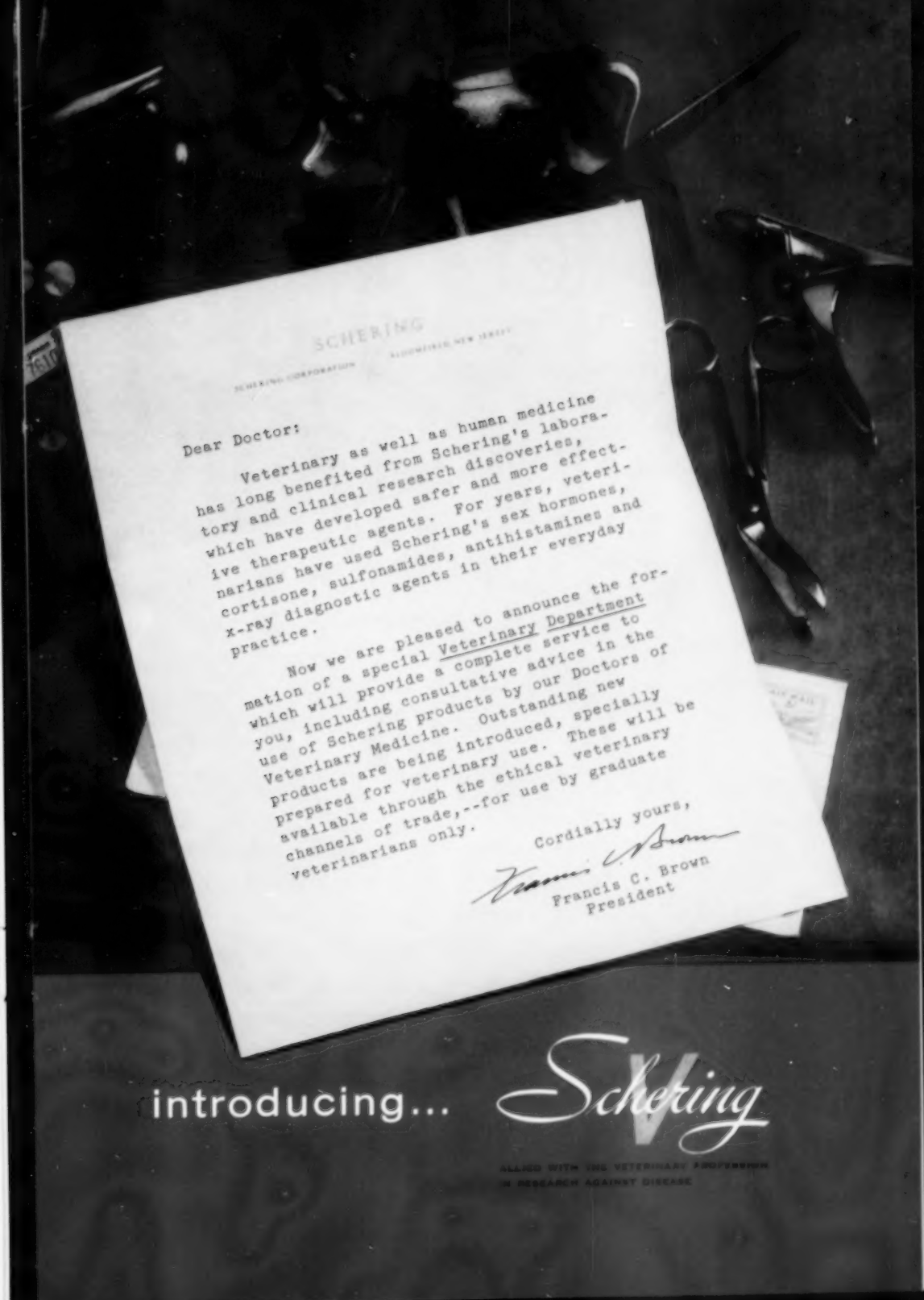
Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bldg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodswether Rd., Kansas City 5, Mo., secretary.

Kern County (Calif.) Veterinary Medical Association, the first Thursday evening of each month. B. C. Watson, 825 14th St., Bakersfield, Calif., secretary.

Keystone (Pa.) Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St. W., Huntington, W. Va.

(*Continued on p. 30*)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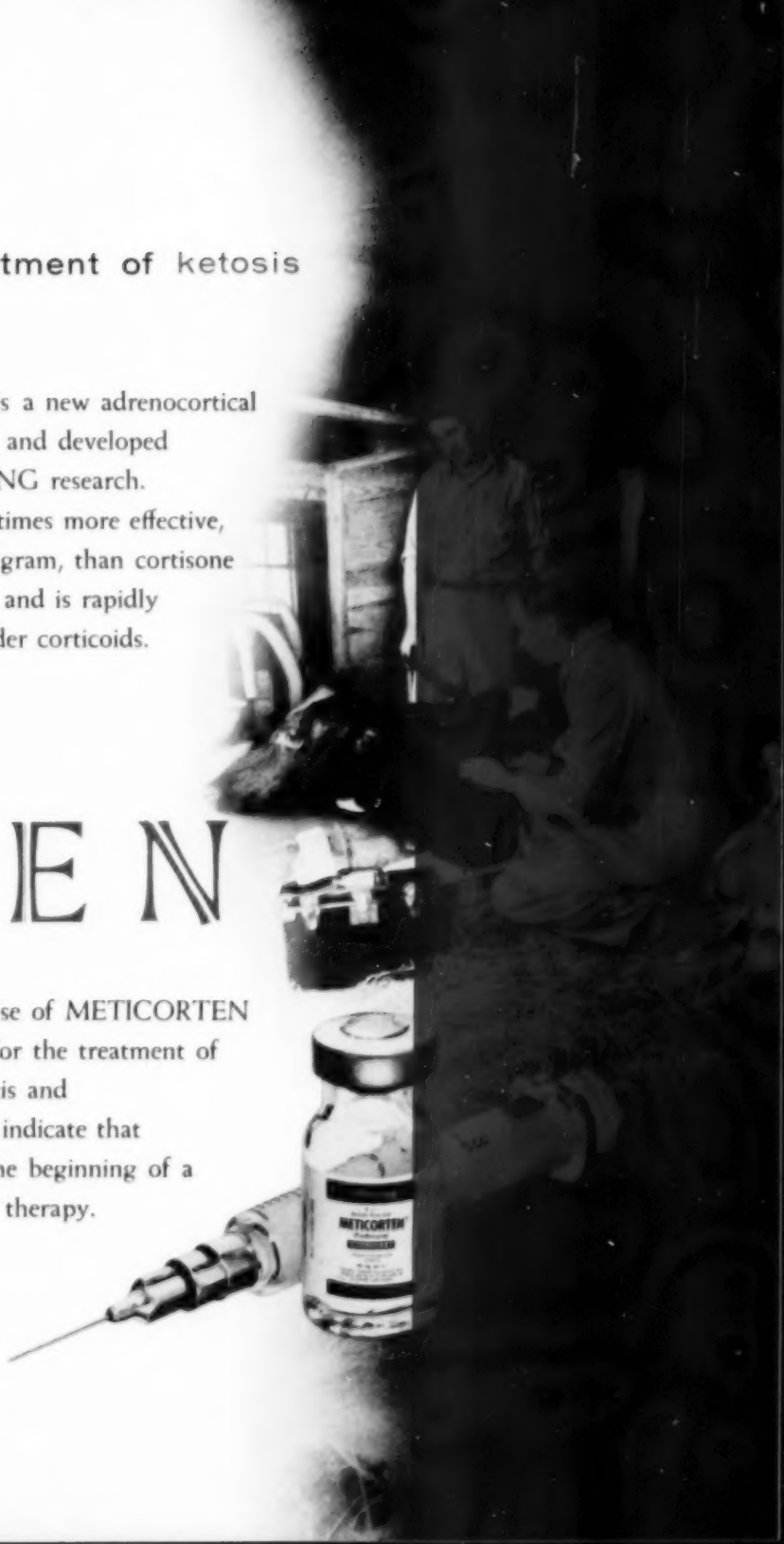

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effective treatment
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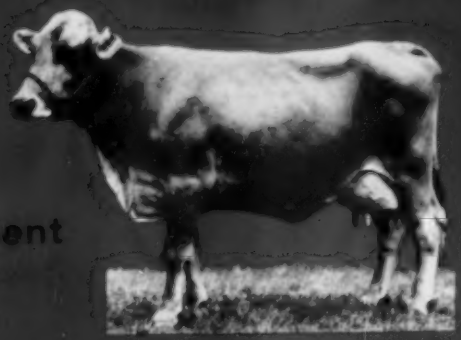

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*T.M.

V-VT-J-51

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at the Hotel LaSalle, South Bend, Ind. L. D. Ramsay, 719 E. Jefferson Ave., La Porte, Ind., secretary.

Michigan, Southeastern Veterinary Medical Association, the second Thursday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Road, Detroit 5, Mich., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. George McCollister, 2146 Broad St., San Luis Obispo, Calif., secretary.

Mid-State (Mich.) Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

Monterey Bay Area (Calif.) Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campell, 90 Corral de Tierra, Salinas, Calif., secretary.

New Castle County (Del.) Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. Arthur P. Coogan, 2102 New Road, Wilmington 5, Del., secretary.

New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northern Colorado Veterinary Medical Society, the second Monday of each month. William H. Beckenhauer, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teanek, N. J. Edward Baker, 568 Grand Ave., Englewood, N. J., secretary.

(*Continued on p. 31*)

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Ernest Makino, Patterson, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. Carl L. Clark, 127 N. W. 23rd St., Oklahoma City, Okla., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 8:00 p.m. in Antlers Hotel, San Bernardino, Calif. Jay C. Wallis, 112 N. Girard St., Hemet, Calif., secretary.

Orange County (Calif.) Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula (Calif.) Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Piedmont (N. Car.) Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. W. W. Dickson, Box 1071, Gastonia, N. Car., secretary.

Piedmont (S. Car.) Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Pima County (Ariz.) Veterinary Medical Association, the third Wednesday of each month in Tucson. E. T. Anderson, 8420 Tanque Verde Rd., Tucson, Ariz., secretary.

Redwood Empire (Calif.) Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley (Calif.) Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

Saginaw Valley (Mich.) Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

San Diego County (Calif.) Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley (Calif.) Veterinary Medical Association, the second Friday of each month at Eaton's Restaurant in Studio City, Calif. R. A. Button, 5954 Van Nuys Blvd., Van Nuys, Calif., secretary.

Seattle Veterinary Medical Association, the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R., Des Rosiers, 5508 2nd Ave. N. W., Seattle 7, Wash., secretary.

Southeastern (Mich.) Veterinary Medical Asso-

(*Continued on p. 521*

(COMING MEETINGS—*continued from p. 31*)

ciation, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. Howard C. Taylor, 2811 West Olive St., Burbank, Calif., secretary.

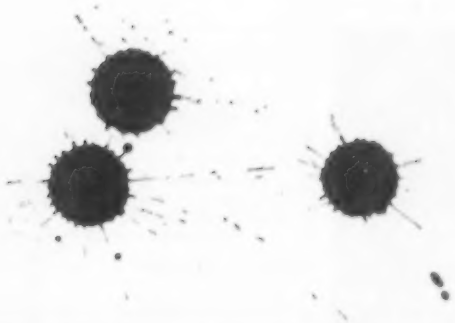
South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

South Puget Sound (Wash.) Veterinary Medical Association, the second Thursday of each month except July and August. Jo Walker, Agriculture Experiment Station, Puyallup, Wash., secretary.

Tenth District (Ind.) Veterinary Medical Association the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

Tulare County (Calif.) Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Tulsa (Okla.) Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Merle S. Watts, 5302 E. 11th St., Tulsa, Okla., secretary.



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SALICYLATE

(brand of carbazochrome salicylate)

systemic hemostat

Adrenosem Salicylate stops capillary bleeding and oozing by direct action on the capillary walls. It is effective by intramuscular and oral administration.

Adrenosem Salicylate can be used pre- and post-operatively in surgery, traumatic injuries, hemorrhage due to infectious disease and internal parasites, or conditions where bleeding from a broad capillary bed is a problem.

Available in Ampuls: 1cc (5 mg.) package of 5
Tablets: 1 mg., S. C. orange, bottles of 50
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Syrup: 5cc contains 2.5 mg. in 4-oz. bottles

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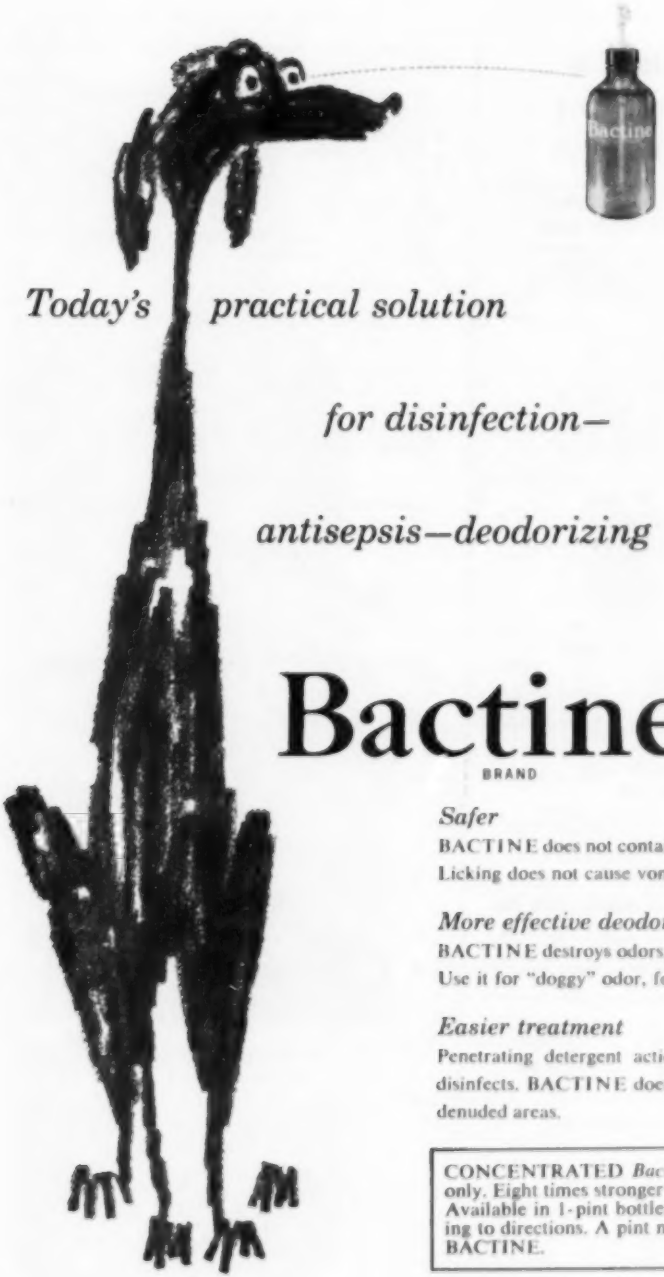
Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Veterinarians wanted for new state meat inspection program. License not required. For further information contact Dr. K. J. Peterson, State Veterinarian, State Department of Agriculture, Salem, Oregon.

Veterinarian wanted to associate with progressive practitioner in large northern Virginia community. Modern small animal hospital; growth necessitates additional veterinary assistance. Year's trial at substantial salary and numerous periodic vacations. Partnership after one year if mutually desired. No mone-

(Continued on p. 56)



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BACTINE does not contain iodine, mercury or phenol. Licking does not cause vomiting or diarrhea.

More effective deodorizing

BACTINE destroys odors, does not merely mask them. Use it for "doggy" odor, feces, even cat urine.

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Penetrating detergent action cleanses as BACTINE disinfects. BACTINE does not sting or burn, even on denuded areas.

CONCENTRATED *Bactine*—for professional use only. Eight times stronger than standard BACTINE. Available in 1-pint bottles. Must be diluted according to directions. A pint makes a gallon of standard BACTINE.

For further information and your free trial supply, write Dept. DI.

MILES LABORATORIES, INC · ELKHART, INDIANA

09054

(CLASSIFIED ADS—*continued from p. 341*)

tary investment. Address "Box S 16," c/o JOURNAL of the AVMA.

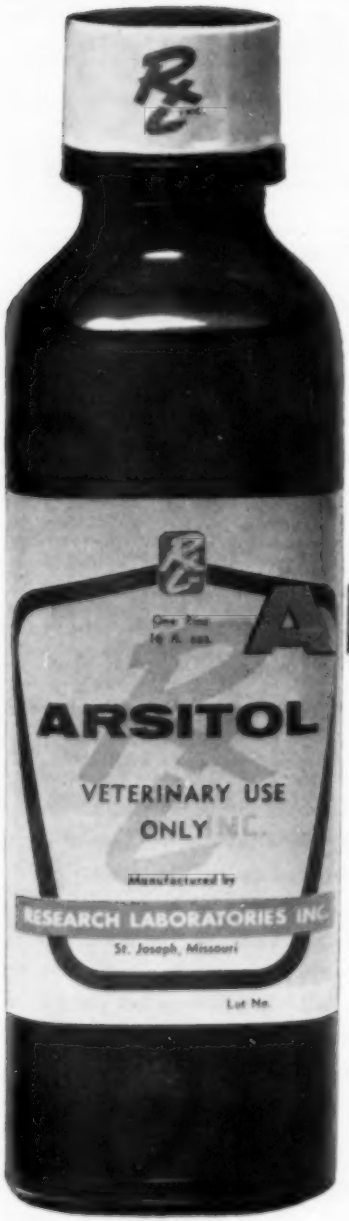
Public Health veterinarians, investigate this excellent opportunity for permanent position. Salary range $483-$587. Requirements are 1 year of recent public health experience and M.P.H. degree. Write County Civil Service, 402 Civic Center, San Diego, Calif.

Veterinarian with New York State license wanted as assistant in small animal practice on Long Island. State qualifications and salary expected. Address "Box T 2," c/o JOURNAL of the AVMA.

Assistant wanted for large animal practice in well-established practice near Chicago. Must be good man, conscientious. Good opportunity. Address "Box T 4," c/o JOURNAL of the AVMA.

Veterinarian wanted to work in mixed practice in central West Virginia; good opportunity for right man. State qualifications and salary expected in first letter. Address "Box T 6," c/o JOURNAL of the AVMA.

(*Continued on p. 381*)



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Swine Enteritis

control from

Research Laboratories

ARSITOL*

- **ARSITOL** stimulates appetite, increases gain, gets pigs back on feed quickly.
- **ARSITOL** is recommended by leading swine practitioners.
- **ARSITOL** provides two way results—from Sodium Arsanilate and B Complex vitamins.
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Available from Independent Ethical Distributors selling to graduate Veterinarian's only.

Research Laboratories, Inc., St. Joseph, Missouri

(CLASSIFIED ADS—*continued from p. 36*)

Wyoming Live Stock and Sanitary Board desires full-time veterinarian for field work. Address inquiries Dr. G. H. Good, State Veterinarian, Capitol Building, Cheyenne, Wyo.

Veterinarian wanted, man or woman, as assistant in animal hospital on New Jersey shore. Begin from September on. Apartment available if desired. Address "Box T 7," c/o JOURNAL of the AVMA.

Licensed veterinarian wanted for small animal position in Maryland. Salary, bonus; future assured. Address "Box T 9," c/o JOURNAL of the AVMA.

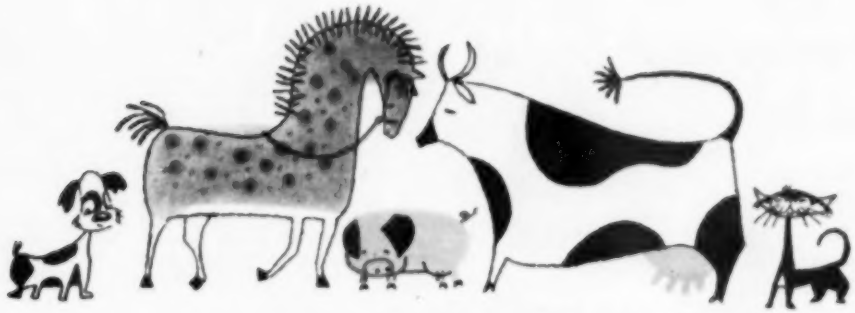
Veterinarian wanted, man or woman, for active small animal hospital in Middlewest. Substantial salary leading to percentage after first year. Attractive living quarters furnished. Address "Box T 11," c/o JOURNAL of the AVMA.

Well-rounded experienced veterinarian needed to become manager and receive a percentage of gross business. Hospital, in southern California, operating in six figure bracket. Address "Box T 14," c/o JOURNAL of the AVMA.

Veterinarian experienced in surgery wanted to service two small animal hospitals in southern California. Address Dr. Leroy E. Schafer, 4411 Arcola Ave., North Hollywood, Calif.

Veterinarian wanted for large and small animal practice; permanent position. State qualifications, references, salary expected in letter. Address Black Hills Anamal Hospital, Rapid City, S. Dak.

(*Continued on p. 40*)



in any kind of bleeding...
"exceptionally effective"[1]

KOAGAMIN®

parenteral hemostat

Proved Again by New Reports on 1507 Animals

Use	Number of Animals	Cause of Bleeding	Advantages of KOAGAMIN
to stop bleeding	534 small animals	accident	satisfactory results in 90% of cases[1]
	372 large and small animals	miscellaneous	in many cases bleeding arrested by initial dose[1]
to prevent bleeding	310 dogs	surgery	clearer operative field[1]
	106 dogs and cats	dental extraction	no untoward reactions[1]
	185 aged dogs	surgery	an important drug for routine use in all surgical procedures[2]

1. Rachman, M., and Frucht, T. R.: Vet. Med. 49:341, 1954.
2. Sternfels, M.: Vet. Med. 50:82, 1955.

KOAGAMIN, an aqueous solution of oxalic and malonic acids for parenteral use, is supplied in 20-cc. diaphragm-stoppered vials.

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(CLASSIFIED ADS—*continued from p. 38*)

Wanted—Practices

Wanted—a good small animal hospital doing at least $20,000 net annually. Address "Box T 15," c/o JOURNAL of the AVMA.

Wanted—Positions

Qualified woman veterinarian, several years of small animal experience, licensed California, desires association with progressive small animal hospital. Will consider lease, partnership, or purchase. Address "Box S 12," c/o JOURNAL of the AVMA.

(*Continued on p. 42*)

FOR BEST RESULTS in inflammatory eye, ear and skin conditions, allergies, arthritis, localized joint disorders, ketosis, overwhelming stress states and infectious diseases (when used with antibiotics in full dosage).

CHOOSE THE DOSAGE FORM BEST ADAPTED FROM THE COMPLETE LINE

SUPPLIED: Topical and ophthalmic ointments, topical lotions, ophthalmic drops (with and without antibiotics, i.e., neomycin and bacitracin), oral tablets, intravenous, intramuscular and intra-articular dosage forms.

Informative literature available to veterinarians on request.

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VETERINARY DEPARTMENT

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

(CLASSIFIED ADS—*continued from p. 40*)

Position wanted leading to partnership or purchase of small animal practice in eastern Pennsylvania or vicinity. General practice experience since graduation; age 32. Address "Box T 5," c/o JOURNAL of the AVMA.

Graduate, 1954, completing internship at Angell Memorial, seeks temporary position in small animal hospital in Massachusetts or Connecticut for period October 15-January 1. Address "Box T 8," c/o JOURNAL of the AVMA.

Recent graduate desires association with small animal or general practitioner in California or Nevada. Military service ends September 30; age 27, single. Licensed in California. Address "Box T 12," c/o JOURNAL of the AVMA.

Desire position in city, county, or state department. Graduate of approved school, 12 years' experience in practice, 3 years in veterinary education. South or Southeast preferred. Address "Box T 19," c/o JOURNAL of the AVMA.

Professional trimmer and handler, 13 years' experience, all breeds, poodles, desires association with veterinary hospital on a percentage basis with guaranteed minimum. Address "Box T 23," c/o JOURNAL of the AVMA.

Capable veterinarian with 10 years' practice experience seeks position with a future in mixed or small animal practice. Licensed in California; references. Initial salary secondary to opportunity for partnership or purchase in good West Coast community. Available at once. Address "Box T 25," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)

SIMPLE... SAFE... SURE

control of nonspecific dermatoses

In just 5 to 15 minutes you can give your patient a complete, effective treatment for those troublesome nonspecific dermatoses. Moist and dry eczema (including severe itching types), as well as mange and fungus infections respond quickly to treatment with

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SUSPENSION

Fleas, lice and mites are killed. Skin texture improves, dryness and scales are eliminated, and the coat acquires a cleaner, softer, glossier appearance. Even the toughest nonspecific dermatoses, where shampoos, sulfur preparations and other medicaments won't work, will usually respond to SELEEN.

Available to veterinarians only, SELEEN comes in 6-fluidounce, pint and gallon bottles. Order direct from Abbott Laboratories, North Chicago, Illinois, or your nearest Abbott branch. Abbott

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Correspondence

July 11, 1955

Dear Editor:

Your editorial entitled "The Salk Vaccine" (July, 1955: 79) states: "The virus of fowlpox had been propagated in embryonating chicken eggs in 1931 and infectious laryngotracheitis a few years later but vaccines for these diseases were not produced commercially until in the 1940's."

These statements are not altogether correct. The first vaccine to be made available commercially that was produced in the chicken embryonated egg was laryngotracheitis vaccine. Our laboratory was the first to obtain a license from the Serum-Virus Control, U.S.D.A., to manufacture this product. A little while later we obtained a permit to manufacture fowlpox and pigeon pox vaccines. These three vaccines, produced in chicken embryonated eggs, were made available to the poultry industry in 1938 and 1939.

Sincerely,
Arthur D. Goldhaft, V.M.D., Director,
Vineland Poultry Laboratories,
Vineland, N.J.

• • •

July 12, 1955

Dear Dr. Aitken:

Read with interest your editorial "The Salk Vaccine" in your JOURNAL. Have noted that N.I.H. adopted the idea of federal inspector at each polio vaccine producing plant.

Enclosed find a clipping from a local paper that may be of some interest.

Very truly yours,
Geo. F. Fasting, M.D.,
Charity Hospital of Louisiana,
New Orleans, La.

[The clipping, among other things, referred to the "deaths and severe reaction in horses following the second vaccine injection" with the chicken embryo vaccine for equine encephalomyelitis in 1940 (*J.A.V.M.A.*, July, 1940: 39-40). So far as we know few, if any, of these reactions have been reported since then.—Ed.]

INTRAMUSCULAR

100 mg., 2.5 Gm.,
5.0 Gm.

Pfizer Tetracycline-Vet

tetracycline is a Pfizer discovery

INTRAVENOUS

250 mg., 500 mg.,
1.0 Gm., 2.5 Gm.
with Water for
Injection, U.S.P.

CAPSULES

100 mg. in bottles
of 100; 250 mg. in
bottles of 16 and 100

NEW! BOLUS

500 mg. in
boxes of 5

NEW!
SOLUBLE POWDER

25 Gm. per lb.
in ½ lb. bottles

Against these organisms

Micrococcus, Streptococcus, Erysipelothrix, Pasteurella, Corynebacterium, Clostridium, Klebsiella, Escherichia, Pseudomonas, Salmonella, Brucella, Listeria, Vibrio, Neisseria, Hemophilus, Shigella and others.

In these diseases

Anthrax, shipping fever, actinomycosis, diphtheria, necrotic stomatitis, pyelonephritis, erysipelas, infectious coryza, peritonitis, coccidiosis, calf scours, enteritis, lamb dysentery, pneumonia, upper respiratory complications, bacterial infections associated with canine distemper, urinary tract infections, feline enteritis, bronchitis, tonsillitis, pharyngitis, parotiditis, otitis media, strangles, metritis, foot rot, equine influenza, navel ill, and other infections caused by tetracycline-sensitive organisms.

Department of
Veterinary Medicine

Pfizer

Pfizer Laboratories, *Brooklyn 6, N.Y.*
Division, Chas. Pfizer & Co., Inc.

Sold only to veterinarians

(CLASSIFIED ADS—*continued from p. 42*)

Danish immigrant veterinarian desires position, small animal or bacteriological-serological work; 1 year in mixed practice, 1½ years in serum laboratory. Graduate of Copenhagen, 1953 (graduates of this school are recommended by AVMA for recognition by State Boards and other agencies); age 27, single. Address "Box T 15," c/o JOURNAL of the AVMA.

Recent graduate desires association with small animal or general practitioner. Licensed in Massachusetts, Connecticut, and Virginia. Available immediately. Address "Box T 17," c/o JOURNAL of the AVMA.

Assistantship desired in progressive small animal hospital. Draft exempt, married, age 32. Licensed in Ohio, Maryland, Washington, D.C., Delaware. Address "Box T 21," c/o JOURNAL of the AVMA.

Graduate of AVMA-approved school, experienced in small animal practice, desires position with small animal practitioner. Address "Box T 22," c/o JOURNAL of the AVMA.

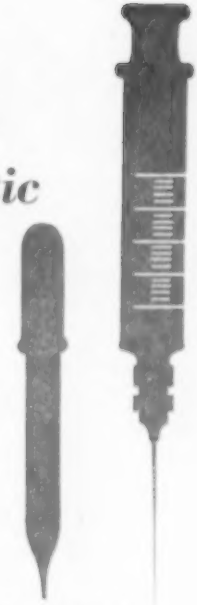
Experience veterinarian wishes to assist small animal practitioner. Progressive surgery a must; graduate AVMA-approved school, married veteran age 30. Address "Box T 28," c/o JOURNAL of the AVMA.

Graduate AVMA-approved school, 5 years' experience in practice and hospital management, desires position with veterinary hospital. Age 30, single, licensed in California and most Middlewest states. Address "Box T 24," c/o JOURNAL of the AVMA.

(*Continued on p. 50*)

IN SMALL-OR LARGE-ANIMAL PRACTICE...

...reach for the dependable all-purpose local anesthetic



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● Where a local anesthetic is indicated, you can now relieve yourself of all doubts about contamination, limited diffusion, toxic after-effects and other uncertainties.

You can rely on Xylocaine, the all-purpose local anesthetic, already well-established among physicians and surgeons and now available to veterinarians. It acts unusually fast and provides anesthesia of longer duration than equal concentration of procaine hydrochloride. Potent, highly stable and well within clinical ranges of tolerance.

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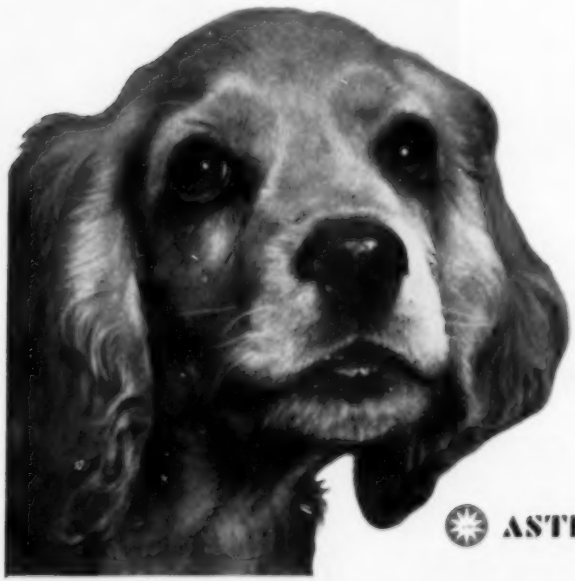

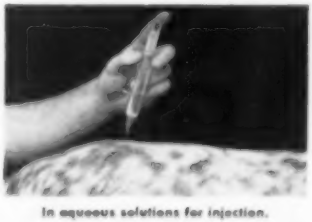

In aqueous solutions for injection.

. . . Or for infiltration. Directions for other recommended procedures in each package.

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POLYOTIC* INTRAMUSCULAR:
100 mg.-500 mg.-1.0 Gm.-5.0 Gm.

POLYOTIC INTRAVENOUS:
100 mg.-2.5 Gm.

POLYOTIC OBLETS®: 4's-6 x 4's

POLYOTIC CAPSULES: 50 mg., 25's-100's;
100 mg., 100's; 250 mg., 16's-100's

POLYOTIC TABLETS: 50 mg., 25's-100's;
100 mg., 25's-100's; 250 mg., 16's-100's

POLYOTIC MASTITIS OINTMENT: ¼ oz.

POLYOTIC COMPOUND MASTITIS OINTMENT: ¼ oz.

POLYOTIC OPHTHALMIC OINTMENT 1%:
6 x ⅛ oz.

POLYOTIC TOPICAL OINTMENT 3%: 1 oz.

POLYOTIC SOLUBLE (Tinted) POWDER:
¼ lb.-½ lb.-1 lb.-5 lb.

AVIANIZED® RABIES VACCINE (Canine):
1 dose-5 x 1 dose-10 doses

AVIANIZED RABIES VACCINE (Cattle): 10 doses

AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose

ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM: 20 cc. 100 cc.

INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.

BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-5 doses (25 cc.)

FELINE DISTEMPER VACCINE: 1 immunization (2 vials Vaccine, 2 vials Sterile Diluent, 2 cc.)

ANTI-FELINE DISTEMPER SERUM: 50 cc.

CARICIDE® Diethylcarbamazine TABLETS:
400 mg., 25's

DIETHYLSTILBESTROL SOLUTION: 10 cc.-50 cc.

LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
Whole Culture Inactivated Vacuum-Dried.

Other products to be added.

*Trade-Mark

Lederle

LEDERLE LABORATORIES DIVISION

Pearl River AMERICAN Cyanamid COMPANY New York

Tetracycline

Here is the newest of the broad-spectrum antibiotics, clinically proved and ready for intravenous, intramuscular, intrauterine, intravaginal, intramammary, conjunctival, aural and topical use.
No other antibiotic is available to the profession only in such a wide variety of dosage forms. No matter what route of administration, there is a POLYOTIC designed for proper professional application and for dispensing. Available to Licensed Veterinarians Only.

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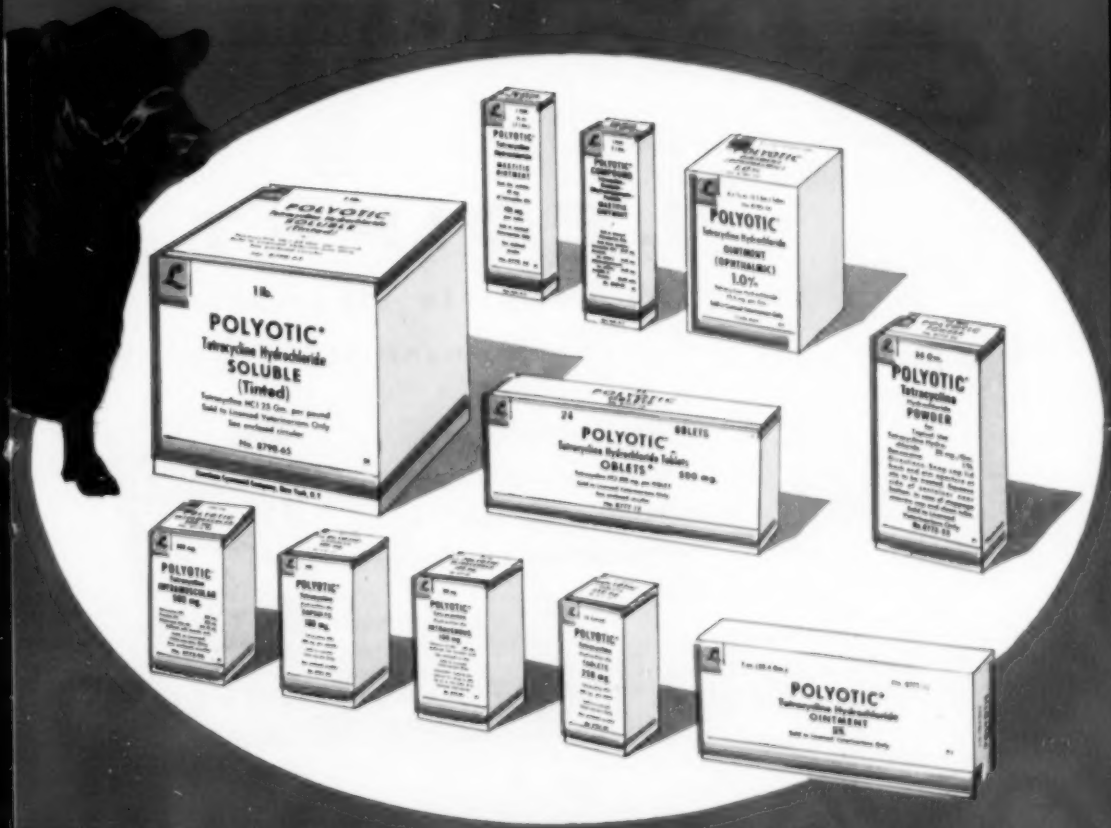

(CLASSIFIED ADS—*continued from p. 46*)

For Sale or Lease—Practices

Completely equipped veterinary hospital for sale; kennels for 58 dogs. Six acres includes 7-room colonial (1772) home in Woodbridge, Conn., outskirts of New Haven. Owner retiring; wonderful opportunity. Write to Mayson Reid, Wm. T. Beazley Co., 70 Elm St., New Haven, Conn.

Small animal hospital for lease, on main street, near San Francisco. Established 15 years; lucrative practice, preferred clientele. Ample space for parking. Address "Box T 18," c/o JOURNAL of the AVMA.

(*Continued on p. 52*)

An important new idea in Distemper-Hepatitis Immunization

distemper hepatitis

sin-jex

vaccine

Sin-jex **is the first Distemper-Hepatitis vaccine to utilize a vacuum dried *modified live virus* distemper fraction, with killed virus hepatitis fraction as diluent. *Sin-jex* gives more positive immunity against distemper: because the modified live virus distemper fraction elicits a more marked immunity response. *Sin-jex* is instantly reconstituted because of the R_L "reconsti-quick" feature. *Sin-jex* is a fine homogenous suspension which passes easily through a 22 guage needle. *Sin-jex* is easily administered with a single subcutaneous injection. *Sin-jex* may be given simultaneously with or without Anti-Canine Distemper-Infectious Hepatitis Anti-Serum. *Sin-jex* produces immunity in less than two weeks. *Sin-jex* may be used before or after weaning.**

Research Laboratories, Inc.
St. Joseph, Missouri

Available from

INDEPENDENT ETHICAL DISTRIBUTORS
selling to Licensed Veterinarians only
* TRADE MARK

(CLASSIFIED ADS—*continued from p. 501*)

Ill health forces sale of central New York AAHA small animal hospital and practice. Much large animal work also, if wanted, but the small animals alone will keep one man very busy; 60 kennels, outside runs, x-ray, separate isolation. Everything—and everything the finest. Large completely modern residence adjoins. A real bargain for a man who wants the finest and is qualified to handle it. Pictures and details on request. Address "Box T 20," c/o JOURNAL of the AVMA.

For sale, 1½ acres in Middlewest on heavily traveled main highway; ideal location for veterinarian. Adjoins finest boarding kennel in the country. Address "Box S 1," c/o JOURNAL of the AVMA.

(*Continued on p. 543*)

New dispensing size for greater convenience and profit!

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5 Gm. of oxytetracycline hydrochloride (Terramycin®) activity per lb.

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Department of Veterinary Medicine **Pfizer** PFIZER LABORATORIES, Brooklyn 6, N. Y.
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(CLASSIFIED ADS—*continued from p. 52*)

Small animal hospital for sale in beautiful Pacific Northwest. Modernistic, fully equipped including 2 x-ray machines, 65 cages and room for more, outside runs, etc.; member A.A.H.A. Practice established 15 years; ill health forces sale. Address "Box T 1," c/o JOURNAL of the AVMA.

Biggest practice west of Ft. Worth; grossed $23,000 last year plus $1,800 annually from city job. All equipment and inventory for this practice (90% small animal) goes for $13,000. Can get financing for half; other half cash. Low-equity 3-bedroom house, if desired. No other real estate. Reason for selling, going into another field. Address "Box T 3," c/o JOURNAL of the AVMA.

Modern, established small animal practice for sale in eastern Pennsylvania; consists of waiting room, examination room, x-ray room, drug room, isolation ward, kennel room, and outside masonry runs. Large animal work available, if desired. Reason for selling, personal. Financing can be arranged. Address "Box T 10," c/o JOURNAL of the AVMA.

Veterinary practice for sale, established 35 years; main artery real estate including 7-room modern home, 30 kennels, equipment, and medical supplies. Owner, moving out of territory, wants action. Thriving area offers unlimited opportunity for growth. Cash needed, $15,000; balance on good terms. Write or phone Harold W. O'Connor, Realtor, 435 Albany Ave., Kingston, N.Y. Phone 5759.

For lease—established veterinary practice, small animal hospital and boarding kennels in suburban Denver, Colo. For particulars, contact the owner Mrs. Harold F. Newton, Box 233, Adams City, Colo.

(*Continued on p. 56*)

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All Stainless Steel Hydraulic Operating Table $279.50
Complete with Casters

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MORENCI, MICHIGAN

(CLASSIFIED ADS—*continued from p. 541*)

Modern small animal hospital for sale on main highway in San Francisco Bay area; only hospital in fast growing community of 23,000—draws from over 35,000. Attractive building, 12 rooms, 50 kennels, 21 runs. Highly efficient floor plan. Excellent buy, $40,000; one-fourth down. Wonderful opportunity to take over well-established, busy practice. Address "Box T 16," c/o JOURNAL of the AVMA.

Veterinary hospital for lease; residence on same premises. Good location, plenty of business for hustler, reasonable. Contact Ova Patterson, 1035 S. Arlington Avenue, Indianapolis, Ind., phone IR 1083.

Practice for sale for inventory value of drugs and instruments only; in northern Iowa town of 1,700. Complete laboratory facilities, two-way radio, cattle chute, kennels, etc. Combination home and hospital can be rented. Practice grosses over $36,000. Address "Box S 2," c/o JOURNAL of the AVMA.

Small animal hospital for sale, Los Angeles suburb; well-equipped and supplied. No property involved. Excellent low-rental lease; $14,000 complete with low down payment. Address "Box P 19," c/o JOURNAL of the AVMA.

(*Continued on p. 581*)

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This little fellow is mighty familiar to you. You've seen him many times. He's the youngster who comes to you whenever his dog is sick or injured. You've seen him smile, too, when you've said, "He's all right, Son. Be good as new in a week." And we know it makes you proud of your profession.

It makes us proud, too, whenever we may, in our own small way, help you keep him smiling . . . for that is certainly one of our primary aims.

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QUALITY DOG FOODS FOR OVER 30 YEARS

(CLASSIFIED ADS—continued from p. 56)

Mixed practice for sale. 16 miles from Indianapolis, Ind.; gross $20,000 plus. Hospital, 5 years old, 6-room apartment above. Selling due to health. Address "Box T 26," c/o JOURNAL of the AVMA.

Miscellaneous

For sale—hydraulic large animal table complete with motor and pump. Excellent condition; must be sold. Address Whitford and McGough Animal Clinic, Pendleton, Ore.

Pregnancy Diagnosis—in mare from 45th to 150th day. Write for vials and mailing tubes. Price: $7.00; 2 or more tests, $6.00 each. Pregnancy Diagnostic Laboratories, H. S. Lames, D.V.M., Dysart, Iowa.

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For Sale—Muffly's Magnetic Retriever, an instrument designed for removing ferrous hardware from the rumen and reticulum of cattle without surgery; price, $45. Address Dr. J. A. Muffly, 125 Stein's Lane, Lewisburg, Pa.

Wanted—American Journal of Veterinary Research, volumes 1945 through 1952. Address your offer to Albert J. Phiebig, Box 352, White Plains, N.Y.

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